UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE WILDLIFE SERVICES

ENVIRONMENTAL ASSESSMENT

7

Reducing Double-crested Cormorant Damage
Through an
Integrated Wildlife Damage Management Program
In the State of Michigan

Prepared By:

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE WILDLIFE SERVICES

In Cooperation with:

UNITED STATES DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (USDA, APHIS, WS) and the Department of Interior, U.S. Fish and Wildlife Service (USFWS) propose to implement a doublecrested cormorant (Phalacrocorax auritus) damage management program in the State of Michigan, including the implementation of the Public Resource Depredation Order (PRDO) (50 CFR 21.48) as promulgated by the USFWS. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce cormorant damage and conflicts to aquaculture, property, natural resources, and human health and safety. Damage management would be conducted on public and private property in Michigan when the resource owner (property owner) or manager requests WS assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, or harassment would be recommended and utilized to reduce damage. In other situations, birds would be humanely removed through use of shooting, egg addling/destruction, nest destruction, or euthanasia following live capture. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. Wildlife damage management activities would be conducted in the State, when requested and funded, on private or public property, after an Agreement for Control or other comparable document has been completed. WS will acquire the necessary landowner permission prior to conducting cormorant damage management activities, including the appropriate landowner permission prior to conducting breeding colony control activities. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing take of double-crested cormorants, and their nests and eggs. The USFWS would be responsible for insuring compliance with the regulations at 50 CFR 21.48 and that the long-term sustainability of regional cormorant populations is not threatened.

ACRONYMS

ADC Animal Damage Control

APHIS Animal and Plant Health Inspection Service

AQDO Aquaculture Depredation Order

AVMA American Veterinary Medical Association

BBS Breeding Bird Survey
BO Biological Opinion

CDM Cormorant Damage Management
CEQ Council on Environmental Quality
CFR Code of Federal Regulations
DCCO Double-crested Cormorant
EA Environmental Assessment
EIS Environmental Impact Statement

EJ Environmental Justice

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act

FAA Federal Aviation Administration
FEIS Final Environmental Impact Statement

FY Fiscal Year

IWDMIntegrated Wildlife Damage ManagementMDNRMichigan Department of Natural Resources

MBTA Migratory Bird Treaty Act
MIS Management Information System
MOU Memorandum of Understanding
NEPA National Environmental Policy Act

NFH National Fish Hatchery

NHPA National Historic Preservation Act
NWRC National Wildlife Research Center
PRDO Public Resource Depredation Order

ROD Record of Decision

SOP Standard Operating Procedure
T&E Threatened and Endangered
USDA U.S. Department of Agriculture
USFWS U.S. Fish and Wildlife Service

WS Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human population expands and more land is used to meet human needs. These human uses often come into conflict with the needs of wildlife which increases the potential for negative human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (USDA 1997):

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and values is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program (formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹) (www.aphis.usda.gov/ws/wsdirectives.html), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means. Wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

USDA/APHIS/WS is authorized by Congress to manage a program to reduce human/wildlife conflicts (Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767)). WS's mission is to "provide leadership in wildlife damage control to protect America's agricultural, industrial and natural resources, and to safeguard public health and safety (USDA 1989)." This is accomplished through:

- training of wildlife damage management professionals;
- development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- collection, evaluation, and dissemination of management information;
- cooperative wildlife damage management programs;

WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

- informing and educating the public on how to reduce wildlife damage and;
- providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out to resolve conflicts with the double-crested cormorant (*Phalacrocorax auritus*; DCCO) in the State of Michigan. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997) and *United States Fish and Wildlife Service Final Environmental Impact Statement: Double-crested Cormorant Management in the United States* (USFWS 2003).

WS is a cooperatively funded, service-oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be completed by WS and the landowner/administrator. WS cooperates with other Federal, State and Local government entities, private property owners and managers, and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable Federal, State, and Local laws.

The primary responsibility of the USFWS is fish, wildlife, and plant conservation. While some of the USFWSs responsibilities are shared with other Federal, State, Tribal, and local entities, the USFWS has special authorities in managing the National Wildlife Refuge System; conserving migratory birds, endangered species, certain marine mammals, and nationally significant fisheries; and enforcing Federal wildlife laws. The USFWS has the primary statutory authority to manage migratory bird populations in the U.S., authority which comes from the Migratory Bird Treaty Act (MBTA).

Individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000, 6,003 (1995)). Double-crested cormorant damage management is a component of the Michigan WS program. Therefore, WS and USFWS have decided to prepare this EA to assist in planning cormorant damage management activities and to clearly communicate with the public the analysis of cumulative effects for a number of issues of concern in relation to alternative means of meeting needs for such management in the State, including the potential cumulative impacts on DCCOs and other wildlife species. This analysis covers WS's plans for current and future CDM actions wherever they might be requested or needed within the State of Michigan.

1.1 PURPOSE

The purpose of this EA is to analyze the effects of WS activities in Michigan to manage damage and conflicts involving double-crested cormorants. Resources protected by such activities include aquaculture, property, natural resources, and human health and safety. This EA considers the potential environmental effects of conducting cormorant management throughout the state of Michigan.

1.2 NEED FOR ACTION

As stated in the USFWS FEIS (USFWS 2003), the recent increase in the North American DCCO population, and subsequent range expansion, has been well-documented along with concerns of negative impacts associated with this expanding population. Wires et al. (2001) and Jackson and Jackson (1995) have suggested that the current DCCO resurgence may be, at least in part, a population recovery following years of DDT-induced reproductive suppression and unregulated take prior to protection under the MBTA. Nonetheless, there appears to be a correlation between increasing DCCO populations and growing concern about associated negative impacts, thus creating a very real management need to address those concerns.

The need to protect aquaculture, property, natural resources, and human health and safety from damage and conflicts associated with DCCOs is described in the USFWS FEIS (USFWS 2003) and is summarized in the following subsections.

1.2.1 Need for CDM to Protect Aquaculture

Double-crested cormorants can feed heavily on fish being raised for human consumption, and on fish commercially raised for other purposes (USFWS 2003). The principal species propagated in the United States are catfish, trout, salmon, tilapia, hybrid striped bass, mollusks, shrimp, crayfish, baitfish and ornamental tropical fish (Price and Nickum 1995; USDA 2000). A 1998 census revealed that the U.S. domestic aquaculture industry represents slightly over 4,000 farms, with total sales reaching \$978 million (USDA 2000).

As reported by Chopak and Newman (1998), Michigan has about 70 active commercial aquaculture businesses located throughout the lower and upper peninsulas. In 1990, there were 117 licensed game fish breeders located in 54 of Michigan's 83 counties. At least 16 different species of fish are raised in Michigan, with rainbow, brook and brown trout, largemouth bass and bluegills the most common. Fish raised for food are the three trout species, catfish, and yellow perch. Fish sold through fee-fishing ponds include the three trout species, bass, bluegills and catfish. All of the species raised in Michigan are also sold as game fish planting stock. In 2003, there were 22 aquaculture facilities selling and/or distributing trout and/or their eggs in Michigan, with total fish sales of \$823,000 and \$663,000 in 2002 and 2003, respectively (USDA-NASS 2003).

The State of Michigan operates six hatcheries and five permanent salmonid egg take stations (MDNR 2003). Two hatcheries are in the Upper Peninsula (Marquette and Thompson State Fish Hatcheries). Four hatcheries are in the Lower Peninsula and all are located on the west side of the peninsula. In addition, Michigan has three national fish hatcheries (NFH) operated by the USFWS; Hiawatha Forest NFH, Jordan River NFH, and Pendills Creek NFH; and three hatcheries operated by Great Lakes Indian Fish and Wildlife Commission member Tribes.

The frequency of occurrence of cormorants at a given aquaculture facility can be a function of many interacting factors, including: (1) size of the regional and local cormorant population; (2) the number, size, and distribution of ponds/raceways; (3) the size, distribution, density, health, and species composition of fish populations in the ponds/raceways; (4) the number, size, and distribution of natural wetlands in the immediate environs; (5) the size distribution, density, health, and species composition of natural fish populations in the surrounding landscape; (6) the number, size, and distribution of suitable roosting habitat; and (7) the variety, intensity and distribution of local damage abatement activities. Cormorants are adept at seeking out the most favorable foraging and roosting sites. As a result, cormorants rarely are distributed evenly over a given region, but rather tend to be highly clumped or localized. Damage abatement activities can shift bird activities from one area to another thereby not eliminating predation but only reducing damage at one site while increasing at another (Aderman and Hill 1995; Mott et al. 1998; Reinhold and Sloan 1999; Tobin et al. 2002). Thus, it is not uncommon for some aquaculture producers in a region to suffer little or no economic damage from cormorants, while others experience exceptionally high losses (Glahn and Bruggers 1995, Glahn et al. 2000b, Glahn et al. 1999, Glahn et al. 2002).

Price and Nickum (1995) conclude that the aquaculture industry has small profit margins so that even a small percentage reduction in the farm gate value due to predation is an economic issue. The magnitude of economic impacts that cormorants have on the aquaculture industry can vary dependent upon many different variables including, the value of the fish stock, number of depredating birds present, and the time of year the predation is taking place.

In Michigan, from 1990-2003, there were 82 reported requests for WS assistance from aquaculture facilities. Within this time period, DCCOs caused approximately \$1,146,400 in reported losses to fish stock at these facilities (WS Management Information System (MIS) data). Two of these requests were verified where DCCOs caused approximately \$600 in losses to fish at each facility.

1.2.2 Need for CDM to Protect Fishery Resources

The rapid increase in double-crested cormorant populations over the last 25 years has led to an increase in conflicts between humans and cormorants including those associated with sport fisheries (USFWS 2003). Double-crested cormorants are opportunistic feeders and therefore feed on a wide diversity of fish species dependant upon location (USFWS 2003). In the Great Lakes, fish species such as the alewife and gizzard shad, appear to be the most important prey items. Stickleback, scuplin, cyprinids, and yellow perch, and at some localities, burbot, freshwater drum, and lake/northern chub are also important prey fish species (Wires et al. 2001). However, cormorants can have a negative impact on recreational fishing on a localized level (USFWS 2003). Recreational fishing benefits local and regional economies in many areas of the U.S., with some local economies relying heavily on income associated with recreational fisheries (USFWS 2003). Outdoor recreation in the Great Lakes region, including Michigan, makes up a substantial portion of the region's economy and quality of life (USFWS 2003). In 1988, anglers spent \$850 million with a resulting impact on tourism and fishing equipment sectors of Michigan's economy of \$1.4 billion (MDNR 1988).

The degree of the effects of DCCO predation on fish in a given body of water is dependent on a number of variables, including the number of birds present, the time of year at which predation is occurring, prey species composition, and physical characteristics such as depth or proximity to shore (which affect prey accessibility). Environmental and human-induced factors affect aquatic ecosystems and fish populations as well. These can be classified as biological/biotic (overexploitation, exotic species, etc.), chemical (water quality, nutrient and contaminant loading, etc.) or physical/abiotic (dredging, dam construction, hydropower operation, siltation, etc.). Such activities may lead to changes in fish species density, diversity, and/or composition due to direct effects on year class strength, recruitment, spawning success, spawning or nursery habitat, and/or competition (USFWS 1995). One such fisheries species that may be affected by DCCO predation in Michigan is the yellow perch.

The following is a Discussion of Fishery Impacts in the Les Cheneaux Islands, Lake Huron, Michigan taken from the USFWS FEIS (USFWS 2003, Appendix 6):

Since the late 1970s, the yellow perch fishery in the Les Cheneaux Islands of northern Lake Huron, which had for decades been economically important to the area (Diana et al. 1987), has experienced a marked decline (Lucchesi 1988). In the mid-1980s, local concern helped lead to a Michigan DNR study which revealed that overfishing may have been at least partially responsible for the decline of the fishery (Lucchesi 1998 in Belyea et al. 1999). A 175mm minimuim size limit was instituated in 987 in an effort to reduce mortality for smaller fish, but did not help the fishery as predicted (Schneeberger and Scott 1997 in Belyea et al. 1999). Yellow perch populations have been declining in many areas of the Great Lakes for several decades, most likely as a result of repeated recruitment failures (Lucchesi 1988, Haas and Schaeffer 1992). Fisheries managers and sport anglers are both concerned that predation pressure from the abundant and growing populations of DCCOs will either contribute to the further decline of yellow perch fisheries or prevent its recovery (Diana and Maruca 1997).

In 1980, DCCOs naturally reestablished at St. Martins Shoal, just west of the Les Cheneaux Islands, after many years of absence. Population surveys in 2001 estimated 4,039 DCCO pairs in the Les Cheneaux Islands area (D. Trexel, University of Minnesota,

unpubl. data). Since 1980, diet studies in the Great Lakes have shown that alewife is the most prominent prey item for DCCOs in nearly every location where alewife and cormorants are found together (Belonger 1983, Craven and Lev 1987, Karwowski et al. 1992, Ludwig et al. 1989, Ross and Johnson 1994, Weseloh and Ewins 1994).

A study conducted in 1995 (Belyea et al. 1999) by the Michigan Department of Natural Resources and the University of Michigan evaluated cormorant-perch interactions in the Les Cheneaux Islands area and, in particular, evaluated population trends in cormorants and yellow perch and determined the effect of cormorant foraging on the yellow perch fishery. The study found that yellow perch comprised about 10 percent of overall DCCO diet with alewives and sticklebacks being the most common prey items, although yellow perch represented 48 percent of DCCO diet for a short period in April (Belyea et al. 1999). It was estimated that the biomass of yellow perch consumed by DCCOs was 7,100 kg during the perch spawning season and 4,300 g during the remainder of the year (1995). These biomass estimates correspond to a range of 270,000 to 720,000 individual perch consumed, with the best estimate being 470,000 (Maruca 1997 in Belyea et al. 1999). Approximately 7,000 to 17,000 of these fish consumed were figured to be young of the year perch. The authors felt it was a reasonable assumption that the removal of up to 17,000 young of the year would not have a substantial effect on yellow perch recruitment (Belyea et al. 1999). As for legal size perch, mortality caused by cormorant predation and summer sport fishing was low (no more than 3.5%) compared to the estimated total annual mortality rate (45%). The authors concluded that "other sources of mortality, therefore, accounted for the majority of yellow perch deaths" (Belyea et al.

The waters of the Les Cheneaux Islands comprise a dynamic area of physical and biological complexity. Part of the biological complexity results from proximity to open waters of Lake Huron and the St. Mary's River. The Les Cheneaux sport fisheries were consistently dominated by yellow perch, but catches of perch varied nearly six fold in the period between 1979 and 1995. Yellow perch populations vary throughout their range, due in part to differences in year class strength. Sport catches of other species (such as northern pike, smallmouth bass, chinook salmon, pink salmon, and lake trout) in the Les Cheneauxs vary dramatically and could have considerable influence on the fish community of the Les Cheneauxs, whether or not they directly influence yellow perch. Also, white perch were documented for the first time in the 1995 creel survey, and if numbers continue to increase, white perch may affect yellow perch populations through competition as they have in other waters (Parish and Margraf 1990, Prout et al. 1990).

Since the late 1970s, the yellow perch fishery in the Les Cheneaux Islands, Michigan has experienced a marked decline (Lucchesi 1988), with the fishery remaining relatively stable through the mid 1990s and then abruptly declined to a near total collapse in 2000 (Fielder 2004). The waters of the Les Cheneaux Islands comprise a dynamic area of physical and biological complexity with both natural and human induced factors potentially affecting the fisheries resource in the area (USFWS 2003). However, despite the recent collapse in angler harvest and fishing pressure, the total annual mortality rate in yellow perch has remained high, ranging from 67% to 78% from 1997 through 2002. During this same time period mean age of perch has also declined from 4.5 years to 1.5 years (Fielder 2004). Concurrent with the decline and collapse of the fishery and loss of perch in certain areas of the islands, was the proliferation of cormorants nesting in the area (Fielder 2004). Nesting populations in the area have increased nearly 6 fold since the early 1990's to a local breeding population of over 5,500 nests in 2002 (Fielder 2004). As indicated by Trexel (2002), the Les Cheneaux DCCO population has slowed and may be to the point of stabilizing.

As described by USFWS (2003), fisheries investigations carried out in 1995 concurrently with

DCCO diet investigations in the Les Cheneaux Islands area found that DCCOs removed only 2.3% of the available yellow perch biomass and accounted for less than 20% of the total annual mortality of perch during that year. Overall, cormorants accounted for 0.8% of the mortality of legal-sized perch (178 mm), whereas summer sport fishing accounted for 2.5%. The conclusion was that DCCOs had minimal impact on the local perch population during that year because of the relatively high abundance of perch and because their predation was buffered for much of the year by abundant alewives (*Alsoa pseudoharengus*) (Fielder 2004, USFWS 2003). However, in the late 1990s the abundant populations of alewives that were fed upon by cormorants during the 1995 study became scarce raising the question of whether cormorant predation on perch may have been greater than previously measured (Fielder 2004).

Fielder (2004) observed that the timing of the rise in the DCCO population coincides closely with the collapse of the yellow perch fishery and such a predation scenario would account for the continued high total annual mortality rate and decline in mean perch age. Fielder (2004) further concludes that these data indicate that the collapse of the fishery and range contraction of perch were caused at least in part by the predatory effects of cormorants and that DCCOs may be contributing to the ongoing suppression of the perch population in the region. A Central Michigan University research study is currently underway investigating the impacts that DCCOs are having on the small-mouthed bass population in the Beaver Island Archipeligo area of Michigan.

1.2.3 Need for CDM to Protect Wildlife and Native Vegetation, Including T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 are preyed upon or otherwise adversely affected by certain bird species, including double-crested cormorants (USFWS 2003). Double-crested cormorants are known to have a negative impact on wetland habitats (Jarvie et al. 1999, Shieldcastle and Martin 1999) and wildlife, including threatened and endangered species (Korfanty et al. 1999).

Cormorants can have a negative impact on vegetation by both chemical (cormorant guano) and physical means (stripping leaves and breaking tree branches) and is of concern in the Great Lakes region, including Michigan (USFWS 2003). Accumulation of cormorant droppings (which contribute excessive ammonium nitrogen), stripping leaves for nesting material, and the combined weight of the birds and their nests can break branches and ultimately kill many trees within 3 to 10 years (Bedard et al. 1995, Korfanty et al. 1999, Lemmon et al. 1994, Lewis 1929, Weseloh et al.1995, Weseloh and Ewins 1994, Weseloh and Collier 1995). Lewis (1929) considers the killing of trees by nesting cormorants to be very local and limited, with most trees he observed to have no commercial timber value. However, tree damage may be perceived as a problem if these trees are rare species, or aesthetically valued (Hatch and Weseloh 1999).

Colonial waterbirds can be displaced by vegetation damage caused by cormorants. Double-crested cormorants can displace colonial species such as black-crowned night herons, egrets, great blue herons, gulls, common terns, and Caspian terns through habitat degradation and nest site competition (USFWS 2003). Cuthbert et al. (2002) examined potential impacts of DCCOs on great blue herons and black-crowned night-herons in the Great Lakes and found that DCCOs have not negatively influenced breeding distribution or productivity of either species at a regional scale, but did contribute to declines in heron presence or site abandonment in certain site specific circumstances. Furthermore, Cuthbert et al. (2002) did find that DCCOs have negative impacts on normal plant growth and survival on a localized level in the Great Lakes region. Wires and Cuthbert (2001) identified vegetation die off as an important threat to 66% of the colonial waterbird colony sites identified as priority conservation sites in the U.S. Great Lakes. Of the 29 priority conservation sites reporting vegetation die off as a threat, Wires and Cuthbert (2001) reported DCCOs present at 23 of these sites. Based upon survey information provided by Wires et al. (2001), biologists in the Great Lakes region, including Michigan, reported cormorants as having an impact to herbaceous layers and trees. Impacts to trees were reported mainly due to

guano deposition, and resulted in tree die off at breeding colonies and roost sites.

Impacts to the herbaceous layer were also reported due to guano deposition, and often this layer was reduced or eliminated from the colony site. In addition, survey respondents reported that DCCO impacts to avian species were mainly through habitat degradation and competition for nest sites (Wires et al. 2001).

1.2.4 Need for CDM to Protect Property

Birds frequently damage structures on private property, or public facilities, with fecal contamination. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion damage to metal structures and painted finishes, including those on automobiles and boats, can occur because of uric acid from bird droppings. Property losses in Michigan associated with cormorants include impacts to stocked fish in privately-owned lakes; damage to boats and marinas or other properties found near cormorant breeding or roosting sites; and damage to vegetation on privately-owned land (USFWS 2003).

1.2.5 Need for CDM to Protect Human Health and Safety

Cormorants are a potential risk to human health and human safety (USFWS 2003). Of greatest concern are the potential impacts that cormorants may have on water quality and the aviation communities.

Human Health Risks

Concerns about water quality and DCCOs exist on two levels: contaminants and pathogens (USFWS 2003). Waterbird excrement can contain coliform bacteria, streptococcus bacteria, Salmonella, toxic chemicals, and nutrients, and it is known to compromise water quality, depending on the number of birds, the amount of excrement, and the size of the water body. Elevated contaminant levels associated with breeding and/or roosting concentrations of DCCOs and their potential effects on groundwater supplies are the major concerns regarding DCCO impacts to human health. Although this effect has not been documented, the potential still exists.

Airport Safety

It is widely recognized throughout the civil and military aviation communities that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000). Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnell et al. 1996, Robinson 1996), as well as erode public confidence in the air transport industry as a whole (Conover et al. 1995).

All birds are potentially hazardous to aircraft and human safety. The hazard potential is dependent on the physical, biological, and behavioral characteristics of each bird. Cormorants are a particular hazard to aircraft because of their body size and mass, slow flight speeds, and their natural tendency to fly in flocks. Blockpoel (1976) states that birds with slow flight speeds can create increased hazards to aircraft because they spend relatively greater lengths of time in aircraft movement areas. There is a very strong relationship between bird weight and the probability of plane damage (Anonymous 1992; Dolbeer 2000). For example, there is a 90% probability of plane damage when the bird weighs 70 or more ounces (4 1/3 pounds) versus a 50% probability of plane damage for a 6 ounce (1/3 pound) bird (Anonymous 1992). Adult DCCOs can weigh up to 6 pounds (Terres 1980).

According to the Federal Aviation Administration's Bird Strike database there were 16 wildlife strikes involving cormorants to civil aircraft in the U.S. from 1990-1999 (USFWS 2003). In October 2002, at Logan International Airport (Boston, MA), a B-767 struck a flock of double-

crested cormorants, resulting in an engine shut down, precautionary landing, and damage to the engine and landing lights. The aircraft was out of service for 3 days, and repairs cost \$1.7 million (Wright 2003). It is estimated that only 20 - 25% of all bird strikes are reported (Conover et al. 1995; Dolbeer et al. 1995; Linnell et al. 1996; Linnell et al. 1999), hence, the number of strikes involving double-crested cormorants is likely greater than Federal Aviation Administration records show. Since 1990, no cormorants have been identified as being involved in wildlife strikes to civil or military aircraft in Michigan.

WS recognizes that the risk to aircraft safety associated with DCCOs is low. WS has received requests for this type of assistance. In an effort to improve aviation safety at Detroit Metropolitan Airport, WS has removed nine DCCO's since 2001. These birds were utilizing drainage ponds which lie in close proximity to active runways and taxiways. Due to the fact that DCCO roosting and feeding sites are found in close proximity to some airports and military airbases in Michigan, it is possible that WS may receive requests for assistance in the future. WS may provide such assistance in Michigan if requested.

1.3 WS RECORD KEEPING REGARDING REQUESTS FOR CORMORANT DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exist.

The database includes, but is not limited to, the following information: species of wildlife involved; the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1-1 provides a summary of DCCO Technical Assistance projects completed by the Michigan WS program for Fiscal Year 1998-2003. A description of the WS Direct Control and Technical Assistance programs are described in Chapter 3 of this

Table 1-1. Number of independent incidents for cormorant technical assistance for Michigan Wildlife Services, by Fiscal Year.

Fiscal Year	Aquaculture	Property	Health & Safety	Natural Resources	Other
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	0	2	0	0	0
2001	4	1	0	0	0
2002	26	2	0	4	0
2003	25	1	1	5	0
Total	55	4	1	9	0

1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS has issued a Final EIS (FEIS) on the

national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA. The FEIS may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

Final Environmental Impact Statement: Double-crested Cormorant Management in the United States. The USFWS has issued a Final EIS (FEIS) and Record of Decision (ROD) (68 Federal Register 58022) on the management of double-crested cormorants (USFWS 2003). WS was a formal cooperating agency in the preparation of the FEIS and has adopted the EIS to support WS' program decisions for its involvement in the management of DCCO damage. WS completed a ROD on November 18, 2003 (68 Federal Register 68020). This EA is tiered to that FEIS. Pertinent and current information available in the EIS has been incorporated by reference into this EA. The FEIS, final ruling and PRDO (see Appendix E) may be obtained by contacting the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, MBSP-4107, Arlington, Virginia 22203 or by downloading it from the USFWS website at http://migratorybirds.fws.gov/issues/cormorant/cormorant.html. WS ROD may be viewed at http://www.aphis.usda.gov/ws/pubs.html.

1.5 DECISION TO BE MADE

The decision making authority for each agency must select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this Environmental Assessment is adequate to support a Finding of No Significant Impact (FONSI) decision, or whether an Environmental Impact Statement will need to be prepared.

Based on the scope of this EA, the decisions to be made by WS are:

- Should WS implement a CDM program including implementation of the PRDO?
- If not, how should cormorant damage and conflicts in the State be managed and what role should WS play in this?
- Might the proposed program have significant effects requiring preparation of an EIS?

1.6 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.6.1 Actions Analyzed

This EA evaluates double-crested cormorant damage management by WS to protect aquaculture, property, natural resources, and human health and safety on private and public land or facilities within the State wherever such management is requested from the WS program.

1.6.2 Period for Which this EA is Valid

This EA would remain valid until both Michigan WS and USFWS along with other appropriate agencies determine that new needs for action, changed conditions, and/or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.6.3 American Indian Tribes and Land

Currently, Michigan WS does not have any MOUs with any American Indian tribe. If WS enters into an agreement with a tribe for CDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted as appropriate before conducting CDM on tribal lands.

1.6.4 Site Specificity

This EA analyzes potential effects of WS's CDM activities that will occur or could occur at private and public property sites or facilities within Michigan. It also addresses the impacts of CDM in areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional CDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of cormorant damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where cormorant damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. The EA emphasizes important issues as they relate to specific areas whenever possible. However, the issues that pertain to the various types of cormorant damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State (See USDA 1997 and Chapter 2 for a more complete description of the WS Decision Model as well as examples of its application). Decisions made using this thought process will be in accordance with any mitigation measures and standard operating procedures described herein and adopted or established as part of the decision.

The analyses in this EA are intended to apply to any action that may occur in any locale and at any time and by any agent (e.g. USFWS, MDNR, or tribal personnel) acting under the authority and guidance of WS within Michigan. In this way, APHIS-WS and USFWS believe they meet the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.

1.6.5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS and USFWS. In part, WS used the USFWS commorant FEIS (2003) to further define the issues and identify preliminary alternatives. As part of this process, and as required by the Council on Environmental Quality (CEQ), APHIS-NEPA, and DOI implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.7 AUTHORITY AND COMPLIANCE

1.7.1 Authority of Federal and State Agencies in Cormorant Damage Management in Michigan²

Wildlife Services Legislative Authority. The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468),

²See Chapter 1 of USDA (1994) for a complete discussion of Federal laws pertaining to WS.

as amended in the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

<u>U.S. Fish and Wildlife Service (USFWS)</u>. The USFWS is responsible for managing and regulating the take of bird species that are protected under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the Endangered Species Act (ESA).

Michigan Department of Natural Resources (MDNR). The Michigan Department of Natural Resources authority in wildlife management is given under Article I, Part 5, Regulation 324.503 of Public Act 451 of 1994. This section states in part;

The department shall protect and conserve the natural resources of this state; provide and develop facilities for outdoor recreation; prevent the destruction of timber and other forest growth by fire or otherwise; promote the reforesting of forest lands belonging to the state; prevent and guard against the pollution of lakes and streams within the state and enforce all laws provided for that purpose with all authority granted by law; and foster and encourage the protecting and propagation of game and fish.

MDNR currently has a MOU with WS. The document establishes a cooperative relationship among WS and MDNR. Responsibilities include planning, coordinating, and implementing policies to address wildlife damage management and facilitating exchange of information.

1.7.2 Compliance with Other Federal Laws

Several other Federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. WS prepares analyses of the environmental effects of program activities to meet procedural requirements of this law. This EA meets the NEPA

requirement for the proposed action in Michigan for both WS and USFWS. When WS operational assistance is requested by another Federal agency, NEPA compliance is the responsibility of the other Federal agency. However, WS could agree to complete NEPA documentation at the request of the other Federal agency.

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve threatened and endangered (T&E) species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available" (Sec.7 (a)(2)). WS obtained a Biological Opinion (B.O.) from USFWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F).

As part of the cormorant FEIS (USFWS 2003), the USFWS completed an intra-Service biological evaluation and informal Section 7 consultation on the management of double-crested cormorants in the U.S. and this resulted in specific provisions for T&E species protection in the regulations implementing the PRDO at 50 CFR 21.48 (see section 4.1.2).

Migratory Bird Treaty Act of 1918 (16 U.S.C. 03-711; 40 Stat. 755), as Amended. The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any "take" of these species by any entities, except as permitted or authorized by the USFWS.

The USFWS issues permits to requesters for reducing migratory bird damage in certain situations. WS provides on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. In severe cases of migratory bird damage, WS provides recommendations to the USFWS for the issuance of depredation permits to private entities or other agencies. The ultimate responsibility for issuing such permits rests with the USFWS.

Executive Order 13186 of January 10, 2001 "Responsibilities of Federal Agencies to Protect Migratory Birds." This Order states that each federal agency, taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, is directed to develop and implement, a MOU with the USFWS that shall promote the conservation of migratory bird populations. WS has developed a draft MOU with the USFWS as required by this Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is finalized and signed by both parties.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act require Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that has the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only

conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the CDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing birds. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice (EJ) is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. EJ is a priority within APHIS and WS and within DOI and USFWS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS and USFWS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. Both agencies' personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons. CDM as proposed in this EA would only involve legally available and approved damage management methods in situations or under circumstances where it is highly unlikely that children would be adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional descriptions of affected environments will be incorporated into the discussion of the environmental effects in Chapter 4.

2.1 AFFECTED ENVIRONMENT

The areas of the proposed action could include areas in and around public and private facilities and properties and at other sites where cormorants may roost, loaf, feed, nest or otherwise occur. Examples of areas where cormorant damage management activities could be conducted are, but are not necessarily limited to: aquaculture facilities; fish hatcheries; lakes; ponds; rivers; swamps; marshes; islands; communally-owned homeowner/property owner association properties; boat marinas; natural areas; wildlife refuges; wildlife management areas; and airports and surrounding areas. The proposed action may be conducted on properties held in private, local, state or federal ownership. WS may conduct breeding bird control activities in any breeding colony site in Michigan, including any of the 48 breeding sites currently identified throughout the state (USDI/USGS 2001). This would include the Les Cheneaux Islands region of Lake Huron and possibly other nesting locations identified by Wires and Cuthbert (2001) as high priority for the conservation of colonial waterbirds in the U.S. Great Lakes. WS will consult the USFWS before undertaking cormorant control activities at the high-priority sites. Of these 48 breeding sites, 19 have been identified to occur on publicly owned land (see Appendix D). WS will acquire the necessary landowner permission prior to conducting cormorant damage management activities, including the appropriate landowner permission prior to conducting breeding colony control activities.

2.2 SUMMARY OF ISSUES

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on double-crested cormorant populations
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Effects on aesthetic values
- Humaneness and animal welfare concerns of the methods used

2.2.1 Effects on Double-crested Cormorant Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA is the double-crested cormorant (*Phalacrocorax auritus*).

Impacts of West Nile virus on bird populations

West Nile (WN) virus has emerged in recent years in temperate regions of North America, with the first appearance of the virus in North America occurring in New York City in 1999 (MMWR 2002, Rappole et al. 2000). Since 1999 the virus has spread across the United States and was reported to occur in 44 states and the District of Columbia in 2002 (MMWR 2002). West Nile virus is typically transmitted between birds and mosquitoes. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of mammals do not become ill

from the virus. The most serious manifestation of the WN virus is fatal encephalitis in humans, horses, and birds. West Nile virus has been detected in dead bird species of at least 138 species, including DCCOs (CDC 2003). Although birds infected with WN virus can die or become ill, most infected birds do survive and may subsequently develop immunity to the virus (CDC 2003, Cornell University 2003). In some bird species, particularly Corvids (crows, blue jays, ravens, magpies), the virus causes disease (often fatal) in a large percentage of infected birds (Audubon 2003, CDC 2003, Cornell University 2003, MMWR 2002). In 2002, WN virus surveillance/monitoring programs revealed that Corvids accounted for 90% of the dead birds reported with crows representing the highest rate of infection (MMWR 2002). Large birds that live and die near humans (i.e. crows) have a greater likelihood of being discovered, therefore the reporting rates tend to be higher for these bird species and are a "good indicator" species for the presence of WV virus in a specific area (Cornell University 2003, Audubon 2003). According to US Geological Survey (USGS), National Wildlife Health Center (2003), information is not currently available to know whether or not WN virus is having an impact on bird populations in North America. USGS states that it is not unusual for a new disease to cause high rates of infection or death because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for a specific bird population to develop sufficient immunity to the virus. Surveys of wild birds completed in the last three years have shown that some birds have already acquired antibodies to the virus (USGS-WHC 2003). Based upon available Christmas Bird Counts and Breeding Bird Surveys, USGS-WHC (2003) states that there have been declines in observations of some local bird populations, however they do not know if the decline can be attributed to WN virus or to some other cause. A review of available crow population data by Audubon (2003) reveals that at least some local crow populations are suffering high WN virus related mortality, but crow numbers do not appear to be declining drastically across broad geographic areas. USGS does not anticipate that the commonly seen species, such as crows and blue jays, will be adversely affected by the virus to the point that these bird species will disappear from the U.S. (USGS-WHC 2003).

2.2.2 Effects on other Wildlife Species, Including T&E Species

A common concern among members of the public and wildlife professionals, including WS and USFWS personnel, is the impact of CDM methods and activities on nontarget species, particularly T&E species. WS's standard operating procedures (SOPs) include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3. To reduce the risks of adverse effects to nontarget species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing nontarget species.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the Endangered Species Act concerning potential effects of CDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC FEIS (USDA 1997, Appendix F). WS is also in the process of reinitiating Section 7 consultation at the program level to assure that potential effects on T&E species have been adequately addressed.

As part of the cormorant FEIS (USFWS 2003), the USFWS completed an intra-Service biological evaluation and informal Section 7 consultation on the management of double-crested cormorants in the U.S. As stated in WS cormorant ROD (68 Federal Register 68020), applicable conservation measures identified in the FEIS and the regulations at 50 CFR 21.48 (d)(8) have been incorporated into the Michigan WS' CDM program (see Section 4.1.2). Of the Federally listed species in Michigan, only the piping plover and bald eagle are of potential concern. Other listed species, including the Kitland's warbler, are not anticipated to be impacted from this program. WS will evaluate potential impacts on T&E species once specific actions are identified to assure that

potential effects on T&E species have been adequately addressed.

Some nontarget species, including colonial waterbirds, may actually benefit from CDM. As described in Section 1.2.3, colonial waterbirds can benefit from reductions in cormorant populations, which may compete for nesting space and destroy important nesting habitat.

2.2.3 Effects on Human Health and Safety

2.2.3.1 Effects on Human Health and Safety from CDM Methods

Some people may be concerned that WS's use of CDM methods, such as firearms and pyrotechnic scaring devices, could cause injuries to people. WS personnel occasionally use rifles and shotguns to remove or scare cormorants that are causing damage. Shotguns may also be used on airports to scare or remove birds which pose a threat to aircraft or air passenger safety. WS frequently uses pyrotechnics in noise harassment programs to disperse or move birds. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is very sensitive and a public concern because of safety relating to the public, and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards. WS employees who carry firearms as a condition of employment are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

2.2.3.2 Effects on Human Health and Safety from Not Conducting CDM

The concern stated here is that the absence of adequate CDM would result in adverse effects on human health and safety, because cormorant damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

2.2.4 Effects on Aesthetic Values

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people, directly affected by problems and threats to public health or safety associated with wildlife, insist upon their removal from the property or public location when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the problems caused by wildlife, strongly support removal. Individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those totally opposed to wildlife damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of wildlife regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used by WS

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."

Suffering is described as a "... highly unpleasant emotional response usually associated with pain and distress." However, suffering "... can occur without pain...," and "... pain can occur without suffering..." (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for "... little or no suffering where death comes immediately..." (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... probably be causes for pain in other animals ..." (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991). Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since "... neither medical or veterinary curricula explicitly address suffering or its relief" (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an

animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area

Some individuals might question whether preparing an EA for an area as large as Michigan would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of Federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. Although WS can predict some of the possible locations or types of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a cormorant damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and State agencies. Such broad scale population control would also be impractical, or impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative effects, one EA analyzing impacts for the entire State will provide a better analysis than multiple EA's covering smaller zones.

2.3.2 WS's Effect on Biodiversity

The WS program does not attempt to eradicate any native species of wildlife in Michigan. WS operates in accordance with international, Federal and State laws, and regulations enacted to ensure species viability. Effects on target and nontarget species populations because of WS's lethal CDM activities are minor, as shown in Section 4.1.1 and 4.1.2. The effects of the WS program on biodiversity are not significant nationwide or statewide (USDA 1997).

2.3.3 Wildlife Damage is a Cost of Doing Business — a "Threshold of Loss" Should Be Established Before Allowing Any Lethal CDM

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, resource owners and situations differ widely and a set wildlife damage threshold levels would be difficult to determine or justify. WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify

the need for wildlife damage management actions.

CHAPTER 3: ALTERNATIVES

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992); Appendix J ("Methods of Control"), Appendix N ("Examples of WS Decision Model"), and Appendix P ("Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program") of the ADC FEIS (USDA 1997); and Appendix 4 ("Management Techniques") of the USFWS Cormorant FEIS (USFWS 2003).

3.0 ALTERNATIVES ANALYZED IN DETAIL

Alternatives analyzed in detail are:

- Alternative 1 Integrated CDM Program, including implementation of the PRDO (Proposed Action).
- Alternative 2 Non-lethal CDM Only By WS.
- Alternative 3 Technical Assistance Only.
- Alternative 4 No Federal WS CDM. This alternative consists of no CDM program by WS.
- Alternative 5 Integrated CDM Program, excluding implementation of the PRDO (No Action). This is the "No Action" alternative as defined by the Council on Environmental Quality

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

WS and USFWS propose to implement a double-crested cormorant damage management program in the State of Michigan, including the implementation of the PRDO (50 CFR 21.48) as promulgated by the USFWS. An Integrated Wildlife Damage Management approach would be implemented to reduce cormorant damage and conflicts to aquaculture, property, natural resources, and human health and safety. Damage management would be conducted on public and private property in Michigan when the resource owner (property owner) or manager requests WS assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, or harassment would be recommended and utilized to reduce damage. In other situations, birds would be humanely removed through use of shooting, egg addling/destruction, nest destruction, or euthanasia following live capture. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. Wildlife damage management activities would be conducted in the State, when requested and funded, on private or public property, after an Agreement for Control or other comparable document has been completed. WS will acquire the necessary landowner permission prior to conducting cormorant damage management activities, including the appropriate landowner permission prior to conducting breeding colony control activities. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing take of double-crested cormorants, and their nests and eggs. The USFWS would be responsible for insuring compliance with the regulations at 50 CFR 21.48 and that the long-term sustainability of regional cormorant populations is not threatened.

3.1.2 Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, WS would be restricted to implementing or recommending only non-lethal methods in providing assistance with cormorant damage problems. Entities requesting CDM assistance for damage concerns would only be provided information on non-lethal methods such as harassment, resource management, exclusionary devices, or habitat alteration. However, it is possible that persons receiving WS' non-lethal technical and direct control assistance could still resort to lethal methods that were available to them. Information on lethal CDM methods would not be available from WS but would still be available to through sources such as USDA Agricultural Extension Service offices, USFWS, MDNR, universities, or pest control organizations.

3.1.3 Alternative 3 - Technical Assistance Only

This alternative would not allow for WS operational CDM in Michigan. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct CDM using any non-lethal or lethal method that is legally available to them. WS would not take part in the implementation of the PRDO.

3.1.4 Alternative 4 - No Federal WS CDM

This alternative would eliminate WS involvement in CDM in Michigan. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own CDM without WS input. Information on CDM methods would still be available through other sources such as USDA Agricultural Extension Service offices, USFWS, MDNR, universities, or pest control organizations.

3.1.5 Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

This alternative would be similar to Alternative 1, with the exception that WS will not take part in the implementation of the PRDO. More specifically, WS would not kill DCCO's or conduct egg addling/destruction to protect public resources (fish, wildlife, plants, and their habitats) on private and public lands, and freshwaters under the authority provided to WS by 50 CFR 21.48. The MDNR and Indian Tribes would be able to implement the PRDO; and the USFWS would continue to issue migratory bird permits to take DCCOs and their eggs. An Integrated Wildlife Damage Management approach would be implemented to reduce cormorant damage and conflicts to aquaculture, property, natural resources, and human health and safety. Damage management would be conducted on public and private property in Michigan when the resource owner (property owner) or manager requests WS assistance including the use of lethal and non-lethal methods. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992).

3.2 CDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN MICHIGAN

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2, 3 and 5 described above. Alternative 4 would terminate both WS technical assistance and operational CDM by WS. Appendix 4 of the USFWS cormorant FEIS (USFWS 2003) provides a more detailed description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective³ manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (e.g., fish husbandry), habitat modification (e.g., exclusion, vegetation management), animal behavior modification (e.g., scaring, roost dispersal), and removal of individual offending animals (e.g., shooting, live capture), local population reduction (e.g., shooting, nest and egg destruction), or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies That WS Employs

Technical Assistance Recommendations

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving cormorant damage problems.

Direct Damage Management Assistance

This is the implementation or supervision of damage management activities by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when Agreements for Control or other comparable instruments provide for direct damage management by WS. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use chemicals are necessary, or if the problems are complex.

Educational Efforts

Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

³The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

3.2.3 Examples of WS Direct Operational and Technical Assistance in CDM in Michigan

Management of Damage to Aquaculture

Michigan WS is currently cooperating with the Michigan Aquaculture Association ⁴, the Michigan DNR, and private aquaculture producers and sportsman's clubs to resolve many problems caused by cormorants. Assistance is offered primarily in the form of technical assistance via site visits or phone consultations. Issues are addressed through an integrated program for conducting cormorant damage management activities. Michigan WS also works closely with the NWRC Starkville Field Station to collect data and evaluate problems related to fish-eating birds.

WS may receive requests for assistance in resolving aquaculture conflicts with cormorants in the future from entities previously discussed, or other agencies or property owners in Michigan. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in these situations.

Management of Damage to Property/Natural Resources

Habitat damage by roosting cormorants within the Les Cheneaux islands in northern Lake Huron has been increasing over the last few years. Accumulation of the cormorants' acidic feces, the proclivity of stripping of leaves for nests and the weight of both birds and nests in trees can destroy vegetation (Bedard et al. 1995, Korfanty et al. 1999, Lemmon et al. 1994, Lewis 1929, Weseloh et al. 1995, Weseloh and Ewins 1994, Weseloh and Collier 1995).

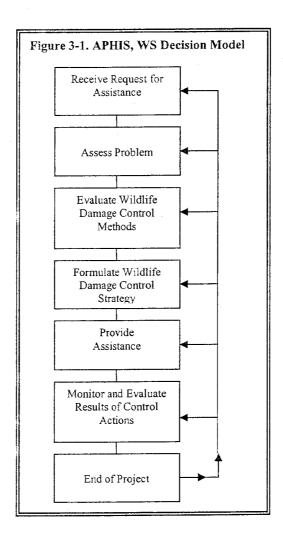
The perch fishery around the Les Cheneaux islands was once an attractive fishing and tourist destination. However, the decline in the perch fishery and similar decline in the aesthetic appeal of the Les Cheneaux islands has reduced the attractiveness of this area for tourism. Assistance to the public concerned about overabundant cormorants has generally been in the form of non-lethal harassment with pyrotechnics. However, the use of non-lethal harassment may not be feasible in all situations. The use of pyrotechnics can displace and disrupt nesting colonial waterbirds in some situations, and the noise attributed to pyrotechnics can cause negative impacts to neighboring property owners. When WS assistance is provided in these situations, WS provides recommendations of how to minimize these impacts.

3.2.4 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for acceptably reducing damage. WS personnel assess the problem; and evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for

In compliance with a Federal court injunction granted to the American Farm Bureau and Texas Farm Bureau (February 9, 2000), which states that WS is restrained and prohibited from releasing to third parties any private information, this information has been removed from this document.

further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions.



3.2.5 Cormorant Damage Management Methods Available for Use by WS (see Appendix 4 of USFWS FEIS (USFWS 2003) for detailed description of methods)

3.2.5.1 Non-lethal Methods

Agricultural producer and property owner practices consist primarily of non-lethal preventative methods such as cultural methods⁵ and habitat modification.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some, but not all, of these tactics include the following:

⁵Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife

- Exclusion methods such as netting,
- Propane exploders (to scare birds),
- Pyrotechnics (to scare birds),
- Distress calls and sound producing devices (to scare birds),
- Visual repellents and scaring tactics (to scare birds),
- Lasers (to scare birds), and
- Scarecrows.

Dispersal of DCCO day/night roosts.

Nest destruction of the target species before eggs or young are in the nest.

Lasers are a non-lethal technique recently evaluated by NWRC (Blackwell et al. 2002, Glahn et al. 2000a). The low-powered laser has proven to be effective in dispersing a variety of bird species in a number of different environments. The low-powered laser is most effective before dawn or after dusk when the red beam of the laser is clearly visible. Bright sunlight will "wash out" the laser light rendering it ineffective. Although researchers are not sure if birds see the same red spot as people, it is clear that certain bird species elicit an avoidance response in reaction to the laser. The birds view the light as a physical object or predator coming toward them and generally fly away to escape. Research, however, has shown that the effectiveness of low-powered lasers varies depending on the bird species and the context of the application.

Waterfowl, such as ducks and geese, have been successfully relocated using low-powered lasers (Blackwell et al. 2002). Long-legged wading birds, like great blue herons, have also been successfully dispersed using low-powered laser light. This discovery is especially important to aquaculture producers because it gives them another non-lethal tool for combating the heron, the double-crested cormorant, and other fish-eating birds (Glahn et al. 2000a).

The low-powered lasers that have been developed safely and effectively disperse birds without harming them or people. At higher levels, lasers can burn tissue, causing injury to people and animals. Although low-powered lasers can be effective when used in combination with other non-lethal methods, they should not be considered a cure-all. As with any non-lethal measure, once enforcement stops, problem birds can return to cause conflict again. In certain situations, non-lethal management efforts must be continuous to have the desired impact.

3.2.5.2 Lethal Methods

Egg addling/destruction is the practice of destroying the embryo in the egg prior to hatching; physically breaking eggs; or directly removing eggs from a nest and destroying them.

Egg oiling is a method for suppressing reproduction of birds by spraying a small quantity of food grade vegetable/corn oil on eggs in nests.

Live traps/nets are various types of traps designed to capture birds alive. Cormorants captured in live traps, nets, or by hand would be humanely euthanized.

Shooting is more effective as a dispersal technique than as a way to reduce bird numbers. Shooting with rifles or shotguns is sometimes used to manage DCCO damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. The number that can be killed by shooting is generally very small in relation to the number involved in damage situations. Shooting can be helpful in some situations to supplement and reinforce other dispersal techniques. It is selective for target species and may be used in conjunction with the use of spotlights and decoys.

Cervical dislocation is an American Veterinary Medical Association (AVMA) approved

euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds which are captured by hand or in live traps/nets. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as a humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and can be quickly accomplished (Beaver et al. 2001).

Carbon dioxide (CO₂) gas is an AVMA approved euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds which are captured in live traps/nets or by hand. Live birds are placed in a container or chamber into which CO₂ gas is released. The birds quickly expire after inhaling the gas. CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO₂ by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.3.1 Lethal CDM Only By WS

Under this alternative, WS would not conduct any non-lethal control of cormorants for CDM purposes in the State, but would only conduct lethal CDM. This alternative was eliminated from further analysis because some cormorant damage problems can be resolved effectively through non-lethal means and at times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms.

3.3.2 Compensation for Cormorant Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by cormorant damage. This alternative was eliminated from further analysis because no Federal or State laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current program.
- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm damage, and certain types of damage could not be conclusively verified.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by Federal and State law.
- Compensation would not be practical for reducing threats to human health and safety or damage to public resources.

3.3.3 Non-lethal Methods Implemented Before Lethal Methods

This alternative is similar to Alternative 1 except that WS personnel would be required to always

recommend or use non-lethal methods prior to recommending or using lethal methods to reduce cormorant damage. Both technical assistance and direct damage management would be provided in the context of a modified IWDM approach. The Proposed Action recognizes non-lethal methods as an important dimension of IWDM, gives them first consideration in the formulation of each management strategy, and recommends or uses them when practical before recommending or using lethal methods. However, the important distinction between the Non-lethal Methods First Alternative and the Proposed Alternative is that the former alternative would require that all non-lethal methods be used before any lethal methods are recommended our used.

While the humaneness of the non-lethal management methods under this alternative would be comparable to the Proposed Program Alternative, the extra harassment caused by the required use of methods that may be ineffective could be considered less humane and may unduly disturb conesting species. As local bird populations increase, the number of areas negatively affected by birds would likely increase and greater numbers of birds would be expected to congregate at sites where non-lethal management efforts were not effective. This may ultimately result in a greater number of birds being killed to reduce damage than if lethal management were immediately implemented at problem locations (Manuwal 1989). Once lethal measures were implemented, cormorant damage would be expected to drop relative to the reduction in localized populations of birds causing damage.

Since in many situations this alternative would result in greater numbers of cormorants being killed to reduce damage, at a greater cost to the requester, and result in a delay of reducing damage in comparison to the Proposed Alternative, the Non-lethal Methods Implemented Before Lethal Methods Alternative is removed from further discussion in this document.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR CORMORANT DAMAGE MANAGEMENT TECHNIQUES

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for effects that otherwise might result from that action. The current WS program, nationwide and in Michigan, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the ADC FEIS (USDA 1997) and Chapter 4 of the DCCO FEIS (USFWS 2003).

3.4.1 Mitigation in Standard Operating Procedures

Some key mitigating measures pertinent to the proposed action and the other alternatives that are incorporated into WS's Standard Operating Procedures include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- Research is being conducted to improve CDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate nontarget hazards and environmental effects.
- WS uses CDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.
- Agents acting under the authority provided to WS to protect public resources (50 CFR 21.48(c)(2)) will be informed and trained in the safe and proper use of CDM methods including applicable laws and regulations authorizing use of these methods.

3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

Effects on Target Species Populations

- CDM activities are directed to resolving DCCO damage problems by taking action
 against individual problem birds, or local populations or groups, not by attempting to
 eradicate populations in the entire area or region.
- WS take is monitored by comparing numbers of birds killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would threaten the long-term sustainability of regional DCCO populations (See Chapter 4).
- As applicable, WS will review the USFWS Final Report (Wires and Cuthbert 2001) "Prioritization of waterbird colony sites for conservation in the U.S. Great Lakes region" prior to conducting control activities at DCCO breeding colonies. If WS conducts control activities at any of the sites identified in this report as "priority sites for waterbird conservation", WS will consult with the USFWS at that time for advice on how to proceed with management actions.
- To avoid adverse impacts on DCCO populations, WS will abide by the terms and conditions of the PRDO (50 CFR 21.48) and USFWS migratory bird permits issued to WS for the management and control of DCCO damage and conflicts, including, but not limited to, reporting on annual basis the number of nests in which eggs were oiled or destroyed and the number of DCCOs killed.
- In certain circumstances when conducting control activities in DCCO breeding colonies, WS is required to notify the USFWS prior to conducting control activities with the approximate number of DCCOs that may be killed under the proposed project (50 CFR 21.48(d)(9)). The USFWS will review this advanced notification to determine if the proposed project would threaten the long-term sustainability of regional DCCO populations.
- When shooting nesting DCCOs, WS will attempt to remove both breeding adults from a specific nest to prevent the possibility of renesting.
- If determined practical and effective, egg oiling and shooting of DCCOs will target different nests or areas of a colony to maximize effectiveness and minimize the potential of renesting.

Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets.
- Observations of birds in areas that are associated with cormorant concentrations are made to determine if nontarget or T&E species (Federal or State Listed) would be at risk from CDM activities.
- As appropriate, management actions taken in mixed-species waterbird colonies would be conducted in such a manner to avoid or minimize impacts to non-target species (i.e. visiting sites during early morning and late afternoon hours to avoid thermal stress to eggs/nestlings, conducting actions as early as possible in the nesting season to reduce nestling abandonment, etc.).
- Egg oiling will only be used for ground and shrub nesting DCCOs to minimize disturbances to co-nesting colonial waterbird species.
- When possible, egg oiling activities will take place during night hours to minimize potential impacts to co-nesting colonial waterbird species. However, WS will not conduct such activities during night hours if it is determined unsafe to do so.

- When possible, when shooting DCCOs from blinds set up in breeding colonies, moving to and from the blinds and blind preparation will be conducted during periods of darkness to minimize impacts to co-nesting colonial waterbird species. However, WS will not conduct such activities during night hours if it is determined unsafe to do so.
- When shooting DCCOs in breeding colonies, WS will utilize the smallest caliber firearm that is effective and will utilize noise-suppressed firearms (silencers) as deemed appropriate to minimize repeated disturbances to co-nesting colonial waterbird species.
- The removal of DCCO carcasses will be completed at such intervals and times of day that will cause the least amount of disturbances to co-nesting colonial waterbird species.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives and/or reasonable and prudent measures established as a result of that consultation (see Section 4.1.2).
- WS will abide by the conservation measures specified in the USFWS FEIS (USFWS 2003) and at 50 CFR 21.48(d)(8) to avoid adverse effects on listed species.
- The Michigan Wildlife Services Office will, prior to undertaking any cormorant management, check the following web site to determine if there are any Federally endangered or threatened species in the counties in which WS wishes to work:

 http://midwest.fws.gov/Endangered/lists/cty_indx.html. If there are, they will contact the U. S. Fish and Wildlife Service's East Lansing Ecological Services Field Office to determine whether the listed species are known to occur at or near any specific sites where WS will be conducting cormorant management activities and could potentially be affected by the work. If they do, WS will comply with the regulations at 50 CFR 21.48 (d)(8) to ensure the protection of these species.
- Prior to any control action, WS will consult with the MDNR to ensure that no actions taken under this plan will adversely affect Michigan's listed species.
- Non-toxic shot will be used when using shotguns to harass or kill DCCOs.
- As applicable, WS will review the USFWS Final Report (Wires and Cuthbert 2001) "Prioritization of waterbird colony sites for conservation in the U.S. Great Lakes region" prior to conducting control activities at DCCO breeding colonies. If WS conducts control activities at any of the sites identified in this report as "priority sites for waterbird conservation", WS will consult with the USFWS at that time for advice on how to proceed with management actions.
- To avoid adverse impacts on nontarget species, WS will abide by the terms and conditions of the PRDO (50 CFR 21.48) and USFWS migratory bird permits issued to WS for the management and control of DCCO damage and conflicts.
- As specified in the PRDO (50 CFR 21.48(d)(10), on an annual basis, WS is required to provide the USFWS with a statement of efforts being made to minimize incidental take of nontarget species and also to report the number and species of migratory bird involved in such take, if any. The USFWS will review this information to ensure control activities taken under the PRDO will not adversely impact nontarget migratory bird species.
- In certain circumstances when conducting control activities in DCCO breeding colonies, WS is required to notify the USFWS prior to conducting control activities which species of other (non-target) bird species are present (50 CFR 21.48(d)(9)). The USFWS will review this advanced notification to determine if the proposed project may threaten the long-term sustainability of nontarget migratory bird species.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and nontarget species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS CDM and USFWS actions are not undertakings that could adversely affect historic resources (See Section 1.7.2)

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

4.1.1 Effects on Double-crested Cormorant Populations

 $\begin{tabular}{ll} Alternative 1-Integrated CDM Program, including implementation of the PRDO \\ (Proposed Action) \end{tabular}$

The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "...a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. Mitigation measures to avoid adverse impacts on DCCO populations are described in Chapter 3.

Double-crested Cormorant Population Effects

Double-crested cormorants range throughout North America, from the Atlantic coast to the Pacific coast (USFWS 2003). During the last 20 years, the cormorant population has expanded to an estimated 372,000 nesting pairs; with the U.S. population (breeding and non-breeding birds) conservatively estimated to be greater than 1 million birds (Tyson et al. 1999). The USFWS estimates the current continental population at approximately 2 million birds (USFWS 2003). Tyson et al. (1999) found that the cormorant population increased about 2.6% annually during the early 1990's. The greatest increase was in the Interior region which was the result of a 22% annual increase in the number of cormorants in Ontario and the U.S. States bordering the Great Lakes (Tyson et al. 1999). The number of breeding pairs of cormorants in the Atlantic and Interior

population is estimated at over 85,510 and 256,212 nesting pairs, respectively (Tyson et al. 1999). DCCOs primarily occur in Michigan during the spring, summer and fall months when the breeding and migrating populations are present (Belyea et al. 1999, Wires et al. 2001, USFWS 2003). This population of DCCOs is primarily composed of birds from the Interior population (USFWS 2003, Tyson et al. 1999). From 1990 to 1997, the annual growth rate in the Interior population was estimated at 6% with the most dramatic increases occurring on Ontario, Michigan, and Wisconsin waters (Tyson et al. 1999, USFWS 2003). Nest counts in 2000 estimated 115,000 nests in the Great Lakes (Weseloh et al. 2002).

Michigan's breeding population has continued to increase with 30,016 nesting pairs being counted in 1997 (Tyson et al. 1999) and is considered by Wires et al. (2001) to have the largest breeding population in the U.S. Great Lakes. This population estimate does not include sub-adults and nonbreeding birds. Estimates of 0.6 to 4.0 nonbreeding cormorants per breeding pair have been used for several populations (Tyson et al. 1999). Therefore, the spring/summer cormorant population in Michigan can conservatively be estimated at more than 78,000 birds. Data from the Breeding Bird Survey (BBS) (1966-2002) shows that the DCCO populations throughout the United States, Canada, USFWS Region 3 (Midwest US), the Eastern BBS region, and Michigan have increased at an annual rate of 8.0%, 11.0%, 6.3%, 8.7% and 9.3%, respectively (Sauer et al. 2003). Nesting populations in the Les Cheneaux Island area have increased nearly 6 fold since the early 1990's to a local breeding population of over 5,500 nests in 2002 (Fielder 2004). As indicated by Trexel (2002), the Les Cheneaux DCCO population has slowed and may be to the point of stabilizing.

Double-crested cormorants are protected by the USFWS under the MBTA. Therefore, cormorants are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds; and their nest and eggs, including the USFWS Aquaculture Depredation Order (AQDO) (50 CFR 21.47), USFWS Public Resource Depredation Order (PRDO) (50 CFR 21.48), and the USFWS and the MDNR permitting processes. The USFWS, as the agency with migratory bird management responsibility, will impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This will assure that cumulative impacts on double-crested cormorant populations would have no significant adverse impact on the quality of the human environment.

Nationwide, the FEIS predicts that the implementation of the AQDO, PRDO and issuance of migratory bird permits will affect approximately 8% of the continental DCCO population on an annual basis (USFWS 2003). Furthermore, the FEIS predicts that authorized take of cormorants and their eggs for the management of double-crested cormorant damage, including those taken in Michigan, is anticipated to have no significant impact on regional or continental double-crested cormorant populations (USFWS 2003). This includes DCCOs that may be killed in Michigan under the PRDO by WS, MDNR, and Indian Tribes; and those taken under USFWS issued permits. DCCOs are a long-lived bird and egg oiling programs are anticipated to have minimal effects on regional or continental cormorant populations (USFWS 2003).

Public Resource Depredation Order (50 CFR 21.48)

According to the FEIS (USFWS, 2003), under the PRDO, the implementation of a state-wide program to reduce cormorant impacts to public resources could result in the lethal take of up to an additional 4,140 cormorants on an annual basis in Michigan. WS predicts that the Michigan WS program would lethally take no more than approximately 85% (3,519) of this statewide total on an annual basis, with the MDNR and Indian Tribes in Michigan lethally removing 15% (621) of this total estimate on an annual basis. The FEIS predicts that the implementation of the PRDO in Michigan will have no significant impact to regional or continental DCCO populations (USFWS 2003).

USFWS Migratory Bird Permits

In 2003, the USFWS authorized 625 DCCOs to be taken under migratory bird permits in Michigan. From FY 1990 through FY 2003, Michigan WS personnel removed only nine cormorants at all project sites in the State in all damage situations (MIS database). However, based on a predicted increase in future requests for services, WS anticipates that no more than 1,000 DCCOs will be taken annually by WS in Michigan under USFWS issued migratory bird permits. The FEIS predicts that the issuance of migratory bird permits in Michigan will have no significant impact to regional or continental DCCO populations (USFWS 2003).

Based upon the above information, Michigan WS potential impacts to populations of DCCOs is expected to be insignificant to the overall viability and reproductive success of this bird species population on a local, state, regional, and nationwide scale. The MDNR concurs with the assertion that the proposed action will not have a significant impact on the overall viability and reproductive success of DCCOs in Michigan (W.E. Moritz, MDNR)

Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, WS would not kill any DCCOs or destroy eggs because no lethal methods would be used. MDNR, USFWS, Indian Tribes, and others could still implement lethal control actions that are available to them. Although WS lethal take of cormorants would not occur, it is likely that without WS conducting some level of lethal CDM, CDM efforts by non-WS personnel could increase, leading to potentially similar or even greater effects on DCCO populations than those of the no action alternative. For the same reasons shown in the population effects analysis under the proposed action it is unlikely that cormorant populations would be adversely impacted by implementation of this alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no impact on cormorant populations in the State because the program would not conduct any operational CDM activities but would be limited to providing advice only. WS would not take part in the implementation of the PRDO. MDNR, USFWS, Indian Tribes, and others could still implement control actions that are available to them. CDM efforts by non-WS personnel, to reduce or prevent cormorant damage and conflicts could increase which could result in similar or even greater effects on those populations than no action alternative. For the same reasons shown in the population effects analysis under the proposed action it is unlikely that cormorant populations would be adversely impacted by implementation of this alternative. Effects on cormorant populations under this alternative would probably be about the same as those under Alternative 2.

Alternative 4 - No Federal WS CDM

Under this alternative, WS would have no impact on cormorant populations in the State. MDNR, USFWS, Indian Tribes, and others could still implement control actions that are available to them. Private efforts to reduce or prevent damage and conflicts could increase which could result in effects on cormorant populations to an unknown degree. Effects on cormorants under this alternative could be the same, less, or more than those of the no action alternative depending on the level of effort expended by these individuals. For the same reasons shown in the population effects analysis under the proposed action it is unlikely that cormorant populations would be adversely impacted by implementation of this alternative.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

Impacts of this alternative would be similar to Alternative 1, except WS would not take part in the implementation of the PRDO. The MDNR and Indian Tribes would be able to implement the PRDO; and the USFWS would continue to issue migratory bird permits to take DCCOs and their eggs.

Public Resource Depredation Order (50 CFR 21.48)

According to the USFWS (2003), under the PRDO, the implementation of a state-wide program to reduce cormorant impacts to public resources could result in the lethal take of up to an additional 4,140 cormorants on an annual basis in Michigan. The FEIS predicts that the implementation of the PRDO in Michigan will have no significant impact to regional or continental DCCO populations (USFWS 2003).

USFWS Migratory Bird Permits

In 2003, the USFWS authorized 625 DCCOs to be taken under migratory bird permits in Michigan. From FY 1990 through FY 2003, Michigan WS personnel removed only nine cormorants at all project sites in the State in all damage situations (MIS database). However, based on a predicted increase in future requests for services, WS anticipates that no more than 1,000 DCCOs will be taken annually by WS in Michigan under USFWS issued migratory bird permits. The USFWS predicts that the issuance of migratory bird permits in Michigan will have no significant impact to regional or continental DCCO populations (USFWS 2003).

For the same reasons shown in the population effects analysis under the proposed action it is unlikely that cormorant populations would be adversely impacted by implementation of this alternative.

4.1.2 Effects on Other Wildlife Species, Including T&E Species

Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

Adverse Effects on Nontarget (non-T&E) Species. Impacts would be similar to the no action alternative.

Beneficial Effects on Nontarget Species. Programs to control cormorant damage can benefit those wildlife species that are impacted by their predation or competition for habitat. Besides competing for nesting space, the acidic droppings of cormorants destroy vegetation, making the area unsuitable for rapid nesting colony restoration. This alternative has the greatest possibility of successfully reducing cormorant damage and conflicts to wildlife species since all CDM methods could possibly be implemented or recommended by WS and WS would be able to implement the PRDO.

<u>T&E Species Effects.</u> Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. Mitigation measures to avoid adverse T&E effects are described in Chapter 3

Federally Listed Species. WS has obtained and reviewed the list of federally listed T&E species for Michigan (see Appendix B for species list). The USFWS has completed an intra-Service biological evaluation and an informal Section 7 consultation on the management of double-crested cormorants in the U.S. for the FEIS and has determined that only the bald eagle, interior least term

(not listed in MI), wood stork (not listed in MI), and piping plover could be adversely affected by CDM actions (USFWS 2003). In accordance with this consultation the USFWS states that the following conservation measures would avoid adverse effects on the bald eagle, wood stork, interior least tern and piping plover:

Under PRDO

- (i) Discharge/use of firearms to kill or harass double-crested cormorants or use of other harassment methods are allowed if the control activities occur more than 1000 feet from active piping plover or interior least tern nests or colonies; occur more than 1500 feet from active wood stork nesting colonies, more than 1000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;
- (ii) Other control activities such as egg oiling, cervical dislocation, CO₂ asphyxiation, egg destruction, or nest destruction are allowed if these activities occur more than 500 feet from active piping plover or interior least tern nests or colonies; occur more than 1500 feet from active wood stork nesting colonies, more than 1000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;
- (iii) To ensure adequate protection of piping plovers, any Agency or their agents who plan to implement control activities that may affect areas designated as piping plover critical habitat in the Great Lakes Region are to make contact with the appropriate Regional Migratory Bird Permit Office prior to implementing control activities.

WS will abide by these conservation measures to avoid adverse impacts to the bald eagle and piping plover in Michigan. Therefore, WS has determined the proposed action will have no effect on any T&E species or critical habitat.

The Michigan Wildlife Services Office will, prior to undertaking any cormorant management, check the following web site to determine if there are any Federally endangered or threatened species in the counties in which WS wishes to work:

http://midwest.fws.gov/Endangered/lists/cty_indx.html. If there are, they will contact the U. S. Fish and Wildlife Service's East Lansing Ecological Services Field Office to determine whether the listed species are known to occur at or near any specific sites where WS will be conducting cormorant management activities and could potentially be affected by the work. If they do, WS will comply with the regulations at 50 CFR 21.48 (d)(8) to ensure the protection of these species.

State Listed Species. WS has obtained and reviewed the State list of Endangered and Threatened Species for Michigan (see Appendix C for species list) and has determined that CDM has the potential to affect only the common and caspian terms, piping plover, and bald eagle in Michigan. Prior to any control action, WS will consult with the MDNR to ensure that no actions taken under this plan will adversely affect Michigan's listed species. In some situations, WS actions could benefit State listed species by reducing cormorant conflicts with those species.

Alternative 2 - Non-lethal CDM Only By WS

Adverse Effects on Nontarget Species

Under this alternative, WS take of nontarget animals would probably be less than that of the no action alternative because no lethal control actions would be taken by WS. However, nontarget take, including impacts on T&E species, would not differ substantially from the current program because the current program has no recorded take of non-target animals. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS non-lethal CDM methods, except for the occasional scaring from harassment devices. In these cases, migratory

birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action.

People whose cormorant damage problems were not effectively resolved by non-lethal control methods would likely resort to other means of lethal control. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife. For example, shooting by persons not proficient at bird identification could lead to killing of nontarget birds.

Beneficial Effects on Nontarget Species

This alternative would reduce negative impacts caused by cormorants to wildlife species and their habitats, including T&E species, if non-lethal methods were effective in reducing such damage to acceptable levels.

If non-lethal methods were ineffective at reducing damage to acceptable levels, WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that cormorant damage to wildlife species and their habitats would likely remain the same or possibly increase dependent upon actions taken by the affected resource or landowner.

Alternative 3 - Technical Assistance Only

Adverse Effects on Nontarget Species

Alternative 3 would not allow any WS direct operational CDM in Michigan. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of resource owners and others. Although technical support might lead to more selective use of lethal control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater take of nontarget wildlife.

Beneficial Effects on Nontarget Species

The ability to reduce negative impacts caused by cormorants to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 since WS would be available to provide information and advice.

Alternative 4 - No Federal WS CDM

Adverse Effects on Nontarget Species

Alternative 4 would not allow any WS CDM in the State. There would be no impact on nontarget or T&E species by WS CDM activities from this alternative. However, private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife.

Beneficial Effects on Nontarget Species

The ability to reduce negative impacts caused by cormorants to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

Adverse Effects on Nontarget (non-T&E) Species. Direct impacts on nontarget species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species, including eggs or young of nesting adults that are disturbed. In general, these impacts result from the use of methods that are not completely selective for target species. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS's CDM methods, except for the occasional scaring from harassment devices and when WS conducts breeding DCCO management in mixed-species waterbird colonies. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Mitigation measures to reduce potential impacts to nontarget species are listed in Chapter 3.

WS take of non-target species during CDM activities has not occurred and should not increase substantially. No non-targets birds or mammals have been killed during CDM operations in Michigan from FY 1999-2003 (MIS database).

While every precaution is taken to safeguard against taking nontarget birds, at times changes in local flight patterns and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the proposed program.

Beneficial Effects on Nontarget Species. Programs to control cormorant damage can benefit those wildlife species that are impacted by their predation or competition for habitat. This alternative would reduce negative impacts caused by cormorants to wildlife species and their habitats, including T&E species, if they could be resolved through other means besides WS implementation of the PRDO. If not, damage and conflicts would likely continue to occur or possibly increase.

T&E Species Effects. Impacts would be similar to the proposed action.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Effects on Human Health and Safety from CDM Methods

Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

CDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics. Firearms are only used by WS personnel and their designated agents who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Michigan WS program has had no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods are expected.

Agents acting under the authority provided to WS to conduct to protect public resources (50 CFR 21.48(c)(2)) will be informed and trained in the safe and proper use of CDM methods including the use of firearms.

Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, CDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique and harassment with pyrotechnics.

Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Michigan WS program has had no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods are expected. Impacts would be similar to the no action alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any CDM methods. Risks to human safety from WS's use of firearms and pyrotechnics would hypothetically be lower than the no action alternative but not significantly because Michigan WS's current program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed.

Resource owners and other non-WS employees would be able to use pyrotechnics or firearms in CDM programs and this activity would likely occur to a greater extent in the absence of WS's assistance. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities are poorly or improperly trained. Since WS would be available to provide advice and information on the safe and proper use of these methods adverse impacts should be less than Alternative 4.

Alternative 4 - No Federal WS CDM

Alternative 4 would not allow any WS CDM in the State. Concerns about human health risks from WS's use of CDM methods would be alleviated because no such use would occur. The use of firearms or pyrotechnics by WS would not occur in CDM activities in the State.

However, private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the no action alternative. Resource owners and other non-WS employees would be able to use pyrotechnics or firearms in CDM programs and this activity would likely occur to a greater extent in the absence of WS's assistance. Hazards to humans and property could be greater under this alternative if personnel conducting CDM activities are poorly or improperly trained.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

CDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Michigan WS program has had no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods are expected.

4.1.3.2 Effects on Human Health and Safety from Not Conducting CDM

Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

Impacts would be similar to the no action alternative. Airport managers and air safety officials are concerned that the absence of a WS CDM program could lead to a failure to adequately address complex wildlife hazard problems faced by the aviation community. Hence, potential effects of not conducting such work could lead to an increased incidence of human injuries or loss of life due to cormorant bird strikes to aircraft.

Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal CDM methods in providing assistance with cormorant damage problems and conflicts. The success or failure of the use of non-lethal methods can be quite variable. In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. Some requesting entities would reject WS assistance for this reason and would likely seek to achieve cormorant control by other means. However, if WS is providing direct operational assistance in relocating cormorants, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

Alternative 3 - Technical Assistance Only

Potential impacts would be variable. With WS technical assistance but no direct management, entities requesting CDM assistance for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective CDM program.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. This potential risk would be less likely under this alternative than Alternative 4 when people requesting assistance receive and accept WS technical assistance recommendations.

Alternative 4 - No Federal WS CDM

Potential impacts would be variable. With no WS assistance, resource owners (land managers) would be responsible for developing and implementing their own CDM program. Efforts by these individuals to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a greater potential of not reducing cormorant hazards, than under the proposed action.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. Under this alternative, human health problems could increase if affected individuals were unable to find and implement effective means of controlling cormorants that cause damage problems.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO

(No Action)

People are concerned with potential injury, illness, and loss of human life resulting from damage and conflicts associated with cormorants. An Integrated CDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All CDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage or threats to public health or safety for people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. As discussed in Chapter 1, cormorants are a threat to aviation safety and can also carry or transmit diseases to humans. In most cases, it is difficult to conclusively prove that cormorants were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of CDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, CDM, either by lethal or non-lethal means, would, if successful, reduce the risk of bird-borne disease transmission at the site for which CDM is requested.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall human health concerns in the local area. If WS is providing direct operational assistance in relocating cormorants, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

4.1.4 Effects on Aesthetic Values

Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

Impacts would be similar to the no action alternative, except in those instances where the implementation of the PRDO improves the aesthetic values of those persons adversely affected by cormorant damage and conflicts to wildlife species and their habitats. In these situations this type of aesthetic "damage" would be less than the no action alternative.

The WS program in Michigan only conducts CDM at the request of the affected property owner or resource manager. If WS received requests from an individual or official for CDM, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, WS would not conduct any lethal CDM but would still use non-lethal CDM methods, such as harassment of birds that were causing damage. Some people who oppose lethal control of wildlife by government but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by the death of individual birds under this alternative, but might oppose dispersal or translocation of certain birds. Although WS would not perform any lethal activities under this alternative, other private/public entities would likely conduct lethal CDM activities in WS absence. The effects would then be similar to the no action alternative.

This alternative would reduce the negative impacts caused by cormorants to aesthetic values if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that negative impacts caused by cormorants would likely remain the same or possibly increase dependent upon actions taken by the affected resource or land owner.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational CDM but would still provide technical assistance or self-help advice to persons requesting assistance with cormorant damage. WS would not take part in the implementation of the PRDO. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed by WS. However, other private/public entities would likely conduct lethal CDM activities in WS absence. The effects would then be similar to the no action alternative.

Under this alternative, the lack of operational assistance in reducing cormorant problems could result in an increase in adverse affects on aesthetic values. However, potential adverse affects would likely be less than as those under Alternative 4, since WS would be providing technical assistance.

Alternative 4 - No Federal WS CDM

Under this alternative, WS would not conduct any CDM in Michigan. Some people who oppose any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual cormorants would not be affected by WS's activities under this alternative. However, other private/public entities would likely conduct CDM activities similar to those no longer conducted by WS. The effects would then be similar to the no action alternative.

Under this alternative, the lack of any operational or technical assistance by WS in reducing cormorant problems would mean aesthetic values of some individuals would continue to be adversely affected if the property owner/manager were not able to achieve CDM some other way. In many cases, this type of aesthetic "damage" would worsen because property owners/managers would not be able to resolve their problems.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

Some people who routinely view individual birds or flocks of cormorants would likely be disturbed by removal of such birds under the current program. WS is aware of such concerns and takes this into consideration when planning CDM activities.

Some people have been opposed to the killing of any birds during CDM activities. Under the current program, some lethal control of cormorants would continue and these persons would continue to be opposed. However, many persons who voice their opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant, therefore continuing to remain available for viewing by persons with that interest. Lethal removal of cormorants

from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The abilities to view and interact with cormorants at these sites are usually either restricted to viewing from a location outside boundary fences or forbidden.

In some instances, large roosting or nesting populations of cormorants can destroy habitat and displace other nesting birds, reducing the aesthetic value for some people. This alternative would reduce negative impacts caused by cormorants to wildlife species and their habitats, if they could be resolved through other means besides WS implementation of the PRDO. If not damage and conflicts would likely continue to occur or possibly increase.

4.1.5 Humaneness and Animal Welfare Concerns of the Methods Used

Alternative 1 - Integrated CDM Program, including implementation of the PRDO (Proposed Action)

Impacts would be similar to the no action alternative. WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some CDM methods are used in situations where non-lethal damage management methods are not practical or effective.

Michigan WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

Alternative 2 - Non-lethal CDM Only By WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. Shooting; and live capture and euthanization by decapitation, cervical dislocation or CO₂ gas could be used by non-WS entities and, similar to the no action alternative, would be viewed by some persons as inhumane.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any lethal or non-lethal CDM, but would provide self-help advice only. Thus, lethal methods viewed as inhumane by some persons would not be used by WS. Similar to Alternative 2, shooting; and live capture and euthanization by decapitation, cervical dislocation or CO₂ gas would be available for use by non-WS entities and would be viewed by some persons as inhumane.

Alternative 4 - No Federal WS CDM

Under this alternative, methods viewed as inhumane by some persons would not be used by WS. Similar to Alternative 2 and 3, shooting; and live trapping/capture and euthanasia by decapitation, cervical dislocation or CO₂ gas could be used by non-WS entities and would be viewed by some persons as inhumane.

Alternative 5 - Integrated CDM Program, excluding implementation of the PRDO (No Action)

Under this alternative, methods viewed by some persons as inhumane would be used in CDM by WS. Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be

shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane.

Occasionally, cormorants captured alive would be euthanized. The most common method of euthanasia would be by decapitation, cervical dislocation or CO₂ gas. These methods are described and approved by AVMA as humane euthanasia methods (Beaver et al. 2001). Most people would view AVMA approved euthanasia methods as humane.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2, 3 and 5, WS would address damage associated with cormorants in a number of situations throughout the State. The WS CDM program would be the primary federal program with CDM responsibilities; however, some state and local government agencies may conduct CDM activities in Michigan as well. Through ongoing coordination with these agencies, WS is aware of such CDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct CDM activities at adjacent sites within the same time frame. In addition, private individuals may conduct CDM activities in the same area as WS. The potential cumulative impacts analyzed below could occur either as a result of WS CDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

CDM methods used or recommended by the WS program in Michigan will likely have no cumulative adverse effects on double-crested cormorant populations and non-target wildlife populations. The intent and expected result of this program is not to reduce the statewide population but to move or remove local groups of birds. WS limited lethal take of DCCOs is anticipated to have minimal impacts on cormorant populations in Michigan, the region, and the U.S. Population trend data and information provided in the FWS FEIS (USFWS 2003) indicate that cormorant populations have increased for Michigan, the region and the U.S. over the past 20 years. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

Cumulative Impact Potential from CDM Methods

CDM methods used or recommended by WS may include exclusion through use of various barriers, habitat modification of structures or vegetation, live trapping and euthanasia of birds, harassment of birds or bird flocks, nest and egg destruction, and shooting. No adverse effects are anticipated from implementation of these CDM methods.

SUMMARY

No significant cumulative environmental impacts are expected from any of the five alternatives. Under the Proposed Action, the lethal removal of cormorants by WS would not have a significant impact on overall cormorant populations in Michigan, but some local reductions may occur. No risk to public safety is expected when WS' services are provided and accepted by requesting individuals in Alternatives 1, 2, 3 and 5 since only trained and experienced wildlife biologists/specialists and designated agents would conduct and recommend CDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2, 3 and 5 and conduct their own CDM

activities, and when no WS assistance is provided in Alternative 4. In all five Alternatives, however, it would not be to the point that the impacts would be significant.

Although some persons will likely be opposed to WS' participation in CDM activities on public and private lands within the state of Michigan, the analysis in this EA indicates that WS Integrated CDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-2 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-1. Summary of impacts of each of the alternatives on each of the issues related to CDM by WS in Michigan.

Issues	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Integrated CDM Program Including PRDO	Non-lethal CDM Only by WS	Technical Assistance Only	No Federal WS CDM Program	Integrated CDM, Excluding PRDO (No Action)
Effects on DCCO Populations	(Proposed Action) Low effect - reductions in local cormorant numbers; would not significantly affect state, regional and continental populations	Low effect - reductions in local cormorant numbers by non-WS personnel likely; would not significantly affect state, regional and continental populations.	No effect by WS. Low effect - reductions in local cormorant numbers by non-WS personnel likely; would not significantly affect state, regional and continental populations.	No effect by WS. Low effect - reductions in local cormorant numbers by non-WS personnel likely; would not significantly affect state, regional and continental populations	Low effect - reductions in local cormorant numbers; would not significantly affect state, regional and continental populations
Effects on Other Wildlife Species, Including T&E Species	Low effect - methods used by WS would be highly selective with very little risk to nontarget species.	Low effect - methods used by WS would be highly selective with very little risk to non- target species.	No effect by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.	Low effect - methods used by WS would be highly selective with very little risk to nontarget species. PRDO has specific measures to minimize impacts to T&E species.
Effects on Human Health and Safety	This alternative will reduce this risk. Low risk from methods used by WS.	Impacts could be greater under this alternative. Low risk from methods used by WS.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing cormorant damage.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing cormorant damage.	This alternative will reduce this risk. Low risk from methods used by WS.
Aesthetic Enjoyment of Cormorants	Low to moderate effect at local levels; Some local populations may be reduced; WS cormorant damage management activities do not adversely affect overall state, regional and continental cormorant populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental cormorant populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental cormorant populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental cormorant populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS cormorant damage management activities do not adversely affect overall state, regional and continental cormorant populations.

Issues	Alternative 1 Integrated CDM Program Including PRDO (Proposed Action)	Alternative 2 Non-lethal CDM Only by WS	Alternative 3 Technical Assistance Only	Alternative 4 No Federal WS CDM Program	Alternative 5 Integrated CDM, Excluding PRDO (No Action)
Aesthetic Damage Caused by Cormorants	Low effect - cormorant damage problems most likely to be resolved without creating or moving problems elsewhere.	Moderate to High effect - cormorants may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alt. 3 and 4.	Moderate to High effect - cormorants may move to other sites which can create aesthetic damage problems at new sites.	High effect - cormorant problems less likely to be resolved without WS involvement. Birds may move to other sites which can create aesthetic damage problems at new sites	Low effect - cormorant damage problems most likely to be resolved without creating or moving problems elsewhere.
Humaneness and Animal Welfare Concerns of Methods Used	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 1 since only non-lethal methods would be used by WS	No effect by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.

CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

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Mike DeCapita	USFWS

CHAPTER 6: RESPONSE TO PUBLIC COMMENTS RECEIVED ON THE PREDECISIONAL EA

Issue 1: To fully comply with NEPA, an Environmental Impact Statement (EIS) should be completed for the proposed cormorant damage management program in Michigan. (This issue is a result of comments received from a conservation organization and an animal protection organization).

Program Response 1: WS and USFWS follow all applicable laws, regulations, and guidelines in analyzing potential impacts of their actions, including those established by NEPA. In making an informed decision of potential environmental impacts, WS uses the best available scientific information, data and expert advice, including the DCCO FEIS (USFWS 2003). As allowed under CEQ NEPA regulations, this EA is tiered to the DCCO FEIS. Appendix A provides a list of documents that are used and referenced throughout the EA for analyzing potential impacts of the proposed program; Chapter 5 provides a list of the persons consulted in the development of the EA; and potential impacts are systematically analyzed in Chapter 4. Each issue is fully explained and analyzed against each alternative to allow the reader an objective way to evaluate potential outcomes of each alternative. By conducting such a systematic and objective analysis, and using the best available scientific information, data and expert advice, WS and USFWS are able to make an informed decision as required by NEPA.

WS and USFWS have determined that the analysis in the EA showed no significant impact on the quality of the human environment. The EA took a hard look at the need for action, the issues, alternatives, and environmental consequences, and resulted in a FONSI by each agency that discussed, under each of the ten CEQ points of significance, why each was not significant. WS and USFWS carefully considered all comments from respondents to the public involvement efforts. The agency followed CEQ NEPA regulations, and Agency NEPA implementing procedures. Thus, the EA resulted in FONSIs that specified why an EIS was not required.

Issue 2: The need to protect sport fisheries and other public resources on a broad scale (regional level) has not been substantiated, is based upon perceived conflicts, is not justified or warranted, and is not supported by science. Cormorant damage to public resources may occur on a localized level, but is having minimal impacts on resources at a broader regional level. (This issue is a result of comments received from a conservation organization; 3 animal protection organizations; and 2 university researchers).

Program Response 2: As described in Sections 1.2.2 and 1.2.3, WS recognizes that cormorant damage to public resources is not a wide spread or common occurrence and occurs on a localized level. When determining if DCCOs are impacting a resource, including sport fisheries and other public resources, WS will use the best information that is available at that time to make this decision. This could include the use of published literature, results of on-going or completed research activities, consultation with the agency or agencies charged with responsibility of overseeing or managing a specific resource, consultation with person(s) with expertise in managing a particular resource, or any other information that will assist WS in making an informed decision.

WS has the legislative authority and responsibility to respond to such requests for assistance, the Michigan WS office will respond to these types of requests for assistance and will take the appropriate course of actions based upon the site specific information collected at the time of the request. Upon receiving a request for assistance, WS will use the WS Decision Model described in Section 3.2.4 when determining the necessary course of action.

WS and USFWS recognize that there is currently contradictory scientific information regarding cormorant impact on the perch fishery in the Great Lakes. This is why we support and are sponsoring continued research on the subject (see Responses 9 and 10). At the same time, there is strong scientific information as presented in the DCCO FEIS (USFWS 2003 and also Response 14) that the proposed cormorant control measures will not threaten the long-term sustainability of the overall cormorant population.

Admittedly, part of the impetus for doing cormorant control is based upon human perception and desire beyond what science can clearly document. Conversely, part of the opposition to conducting such control is also based upon human perception and desires beyond what science can justify.

Issue 3: There is no evidence to substantiate the need to conduct DCCO control activities in the Les Cheneaux region to protect yellow perch. The only published study (Belyea et al. 1997) on DCCO impacts on fish populations in the Les Cheneaux area showed that DCCOs have very little impacts on the yellow perch fish population. (This issue is a result of comments received from a conservation organization; 3 animal protection organizations; and 2 university researchers).

Program Response 3: As discussed in Section 1.2.2 and Appendix 6 of the DCCO FEIS (USFWS 2003), WS recognizes that the 1995 study by Belyea et al. (1997) concluded that DCCOs were having minimal impacts on the yellow perch fish population in the Les Cheneaux region at that time. However (as described in Section 1.2.2), since the completion of the 1995 study, Fielder (2004) has observed that the timing of the rise in the DCCO population in the Les Cheneaux region coincides closely with the collapse of the yellow perch fishery and such a predation scenario would account for the continued high total annual mortality rate and decline in mean perch age. Fielder (2004) further concludes that these data indicate that the collapse of the fishery and range contraction of perch were caused at least in part by the predatory effects of cormorants and that DCCOs may be contributing to the ongoing suppression of the perch population in the region. WS will implement control actions in the Les Cheneaux region based upon the information provided by Fielder (2004). As described in the response to Issue 10, research activities will be conducted concurrently to evaluate the effectiveness of the proposed program in the Les Cheneaux region.

Issue 4: Cormorant management actions will result in significant negative disturbance to other colonial nesting birds, which will impact their reproductive success. (This issue is a result of comments received from a conservation organization; 2 animal protection organizations; and 2 university researchers).

Program Response 4: This issue has been evaluated in Section 4.1.2. Mitigation measures to reduce potential adverse impacts to colonial waterbirds are provided in 3.4, including several additional mitigation measures that have been incorporated in the final EA. By adhering to these mitigation measures, WS DCCO management actions will not have a significant impact on other colonial waterbirds.

Issue 5: The EA fails to mention the priority conservation status of specific colonial waterbird sites located in the Great Lakes Region. Cormorant control should not be implemented on these priority conservation sites due to the potential adverse impacts that control actions may have on colonial waterbirds occupying these sites. Control activities will impact ongoing research activities being conducted on these sites. (This issue is a result of comments received from a conservation organization; and 2 university researchers).

Program Response 5: WS agrees that management actions should be taken in such a manner to minimize potential adverse impacts to these priority conservation sites. WS only conducts damage management activities upon request and will not conduct control activities without first obtaining the necessary landowner permission prior to conducting management actions. Therefore the landowner or land manager can restrict WS access to all or a portion of their property that they do not want management actions to take place. When management actions take place, WS will adhere to the mitigation measures provided in Section 3.4 to reduce potential adverse effects to colonial waterbirds using these locations. Furthermore, as specified in Section 3.4, as applicable, WS will review the USFWS Final Report (Wires and Cuthbert 2001) – "Prioritization of waterbird colony sites for conservation in the U.S. Great Lakes region" prior to conducting control activities at DCCO breeding colonies to determine the potential impacts that control actions may have on a specific DCCO breeding colony and any nontarget colonial waterbirds that may be utilizing the site. If it is determined that WS actions have the potential to adversely affect nontarget

colonial waterbird species, WS will consult with the USFWS at that time for advise on how to minimize potential impacts.

WS and the USFWS acknowledge that ongoing research may be adversely affected by DCCO management activities in certain circumstances. WS will take the appropriate course of action to reduce or eliminate this potential impact whenever possible. This includes not conducting control activities on Green Island where ongoing research is currently being conducted on the interactions of DCCOs with black-crowned night-herons. With respect to the other priority conservation sites referenced by the commentors, more than 90% of the individuals and half of the species nesting at those sites are gulls, which are not of high conservation concern in Michigan or the Great Lakes.

Issue 6: The priority conservation status of specific colonial waterbird sites located in the Great Lakes Region should be conserved and protected from habitat loss or destruction through land acquisition, easements or agreements with landowners. (This issue is a result of comments received from a conservation organization).

Program Response 6: The conservation of waterbird nesting sites through the acquisition of land, easements or agreements with landowners is outside the scope of this EA and WS legislative authority.

Issue 7: Implementation of the Public Resource Depredation Order is not necessary to reduce cormorant damage to natural resources (including sport fisheries), aquaculture, property or human health and safety. There is little evidence to support the need for expanded cormorant control efforts. The current USFWS depredation permitting process is adequate to address these concerns on a case-bycase basis. (This issue is a result of comments received from a conservation organization; and 2 animal protection organizations).

Program Response 7: As discussed above in response to issue # 2 and # 3, WS recognizes that cormorant damage to public resources is not a wide spread or common occurrence and occurs on a localized level. WS has the legislative authority and responsibility to respond to such requests for assistance, the Michigan WS will respond to these types of requests for assistance and will take the appropriate course of actions based upon the site specific information collected at the time of the request.

As described in the proposed action, WS will continue to work with the USFWS to protect aquaculture, property, and human health and safety in Michigan through the USFWS depredation permitting process. Upon receiving a request for assistance, WS will use the WS Decision Model described in Section 3.2.4 when determining the necessary course of action. The Public Resource Depredation Order will not be used to address DCCO conflicts with these types of resources. However, since WS has been given the legal authority to conduct management actions under the Public Resource Depredation Order and the USFWS has acknowledged that migratory bird permits will not be issued to protect public resources in Michigan, WS will use this authority when determined necessary to reduce DCCO conflicts and damage to public resources in Michigan. Similar to the current USFWS migratory bird permitting process, WS will not take management actions under the Depredation Order until the need arises and a request is received for WS assistance.

Issue 8: WS should not manage wildlife based on subjective individual and economic tolerances. (This issue is a result of comments received from an animal protection organization).

Program Response 8: WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000.

Stat. 1549 (Sec 767), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act.

Issue 9: What means or methods will WS use to determine whether cormorants are impacting a specific resource and that the course of action taken will reduce impacts to acceptable levels? How does WS plan to monitor the effectiveness of control actions on affected resources? (This issue is a result of comments received from a conservation organization; 3 animal protection organizations; and 2 university researchers).

Program Response 9: As described in Section 3.2.4, WS uses a decision model which involves evaluating each request for assistance, taking action and evaluating and monitoring results of the actions taken. This decision model will be used when WS receives a request for assistance. Furthermore, when using the authority provided to WS through the PRDO, WS is required on an annual basis, to provide the USFWS with a description of the impacts or anticipated impacts to public resources by DCCOs and a statement of the management objectives for the area in question; a description of the evidence supporting the conclusion that DCCOs are causing or will cause impacts to a public resource; and a discussion of other limiting factors affecting the resource (50 CFR 21.48(d)(10).

When appropriate, WS will assist in research projects evaluating the impacts of DCCO management actions. Information obtained from these studies will be used to evaluate program activities and may be used in planning subsequent DCCO management actions.

Issue 10: How will WS evaluate the effectiveness of DCCO program activities in the Les Cheneaux Islands? (This issue is a result of comments received from a conservation organization; and 2 university researchers).

Program Response 10: In addition to conducting operational activities in the Les Cheneaux Islands, WS National Wildlife Research Center and the Michigan DNR will be conducting concurrent research activities to evaluate the effectiveness of control methods, the effects that control activities are having on DCCOs, and the effects that DCCOs are having on yellow perch populations in the region. Information obtained from these studies will be used when planning subsequent DCCO management actions.

Issue 11: WS assistance provided to aquaculture producers should focus on making aquaculture facilities less attractive to cormorants and on "good" husbandry practices. Cormorant predation at aquaculture facilities can be prevented or reduced through exclusion methods or design of facilities. (This issue is a result of comments received from a conservation organization; and 2 animal protection organizations).

Program Response 11: As described in Section 3.2.5, WS considers such non-lethal approaches as part of the proposed program and WS will make such recommendations to persons requesting assistance when determined practical and effective for the given situation.

Issue 12: WS should focus cormorant management on non-lethal control and use lethal control only as a last resort. (This issue is a result of comments received from a conservation organization; and 2 animal protection organizations).

Program Response 12: This alternative is analyzed in detail in the EA (Alternative 2) and also under Section 3.3.3 (Non-lethal Methods Implemented Before Lethal Methods). WS recognizes the importance of non-lethal methods as part of an integrated approach to managing cormorant damage. As described in the proposed action, WS will continue to consider and use non-lethal methods when appropriate.

Issue 13: The EA does not analyze the impacts of the program on fish populations or angling in Michigan. (This issue is a result of comments received from 2 animal protection organizations).

Program Response 13: The management of fish populations is outside the scope of this EA. The intent of the proposed program is not to manage fish populations, but is to manage cormorant damage to specific resources, including fisheries. When a DCCO damage management program is implemented, it is predicted that recreational fishing opportunities will improve in those situations where DCCOs are negatively impacting a fisheries resource. The level of potential increase will be dependent upon not only the reduction of DCCO predation on the resource, but also on environmental and human-induced factors that affect aquatic ecosystems and fish populations as well.

Issue 14: The Public Resource Depredation Order may adversely impact DCCO populations since the order does not put any restrictions or limits on the number of cormorants that WS may kill. (This issue is a result of comments received from 3 animal protection organizations).

Program Response 14: As discussed in Section 4.1.1, the USFWS determined in the DCCO FEIS that cormorant populations are unlikely to be adversely affected by implementation of this depredation order. According to the DCCO FEIS (USFWS, 2003), under the PRDO, the implementation of a state-wide program to reduce cormorant impacts to public resources could result in the lethal take of up to an additional 4,140 cormorants on an annual basis in Michigan. WS predicts that the Michigan WS program would lethally take no more than approximately 85% (3,519) of this statewide total on an annual basis, with the MDNR and Indian Tribes in Michigan lethally removing up to 15% (621) of this total estimate on an annual basis. The FEIS predicts that the implementation of the PRDO in Michigan will have no significant impact to regional or continental DCCO populations (USFWS 2003).

As specified in 50 CFR 21.48, on an annual basis WS will report all take of cormorants and eggs to the USFWS to assure that the cumulative impacts of cormorant damage management actions in Michigan are not adversely affecting the long-term sustainability of DCCOs in Michigan, the region or nationwide. Furthermore, as described in Section 1.6.2, WS will on an annual basis review this EA to ensure the analysis provided (including impacts to DCCO populations) in the EA is sufficient.

Issue 15: WS should coordinate management activities with other states to avoid adverse impacts to cormorant populations and other wildlife species that may be affected by management actions. (This issue is a result of comments received from 3 animal protection organizations).

Program Response 15: WS agrees that a coordinated approach should be taken to manage DCCO damage in a socially acceptable and biologically controlled manner. As described in the WS Record of Decision (ROD) for the FEIS (68 Federal Register 68020), WS supports a management strategy that includes national, regional, and local DCCO population goals and objectives. This type of coordinated approach to managing DCCO damage would be developed jointly and in cooperation with affected state and federal agencies. Furthermore, as specified in 50 CFR 21.48, on an annual basis WS will report all take of cormorants and eggs to the USFWS to assure that the cumulative impacts of cormorant damage management actions in Michigan are not adversely affecting the long-term sustainability of DCCOs in Michigan, the region or nationwide. As described in Section 1.6.2, WS will on an annual basis review this

EA to ensure the analysis provided (including impacts to DCCO populations and other wildlife species) in the EA is sufficient.

Issue 16: WS implementation of the Public Resource Depredation Order violates the Migratory Bird Treaty Act (MBTA). (This issue is a result of comments received from 2 animal protection organizations).

Program Response 16: As outlined in Section 1.7 and the USFWS Final Rule and ROD (68 Federal Register 58022), WS actions are conducted in accordance with applicable Federal, State, and Local environmental laws and regulations, including the MBTA. The MBTA authorizes the Secretary of Interior, subject to the provisions of, and in order to carry out the purposes of, the applicable conventions, to determine when, if at all, and by what means it is compatible with the terms of the conventions to allow the killing of migratory birds. DCCOs are covered under the terms of the Convention for the Protection of Migratory Birds and Game Mammals with Mexico. The DCCO is a nongame, noninsectivorous bird for which the applicable treaty does not impose specific prohibitions or requirements other than the overall purpose of protection so as not to be exterminated and to permit rational utilization for sport, food, commerce, and industry. In the FEIS for this action, the USFWS considered all of the statutory factors as well as compatibility with the provisions of the convention with Mexico. The Russian convention (Convention between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment, concluded November 19, 1976) provides an authority to cover DCCOs even though not listed in the Appendix. To the extent the USFWS choose to apply the convention, it contains an exception from the prohibitions that may be made for the protection against injury to persons or property.

Issue 17: The list of non-lethal methods available to WS in Michigan does not include anthraquinone. (This issue is a result of comments received from 2 animal protection organizations).

Program Response 17: Anthraquinone, a naturally occurring chemical found in many plant species and in some invertebrates as a natural predator defense mechanism, has shown effectiveness in protecting rice seed from red-winged blackbirds and boat-tailed grackles (Avery et al. 1997). It has also shown effectiveness as a foraging repellent against Canada goose grazing on turf and as a seed repellent against brown-headed cowbirds (Dolbeer et al. 1998). Anthraquinone has not been proven effective for use on DCCOs. If and when this chemical is proven effective and safe to use for DCCO damage management in Michigan, this EA and it's analysis would be supplemented pursuant to NEPA at that time.

Issue 18: The EA must address the economic impact of birders and other non-consumptive users on Michigan's economy. (This issue is a result of comments received from 2 animal protection organizations).

Program Response 18: This issue is outside the scope of the EA.

Issue 19: Potential impacts of WS management actions on wildlife watching; specifically those people that enjoy the presence cormorants and other birds in their natural settings are not mentioned in the EA. (This issue is a result of comments received from 2 animal protection organizations).

Program Response 19: The WS program does not anticipate that the proposed action will have a significant impact on those that enjoy the presence of cormorants or other wildlife species. The WS program does not attempt to eradicate any species of wildlife, including cormorants, in Michigan. As discussed in Section 4.1.4, WS management actions would generally be restricted to local sites and to small, unsubstantial percentages of the overall population. Even though some local populations of cormorants may decline on the short term, these birds would remain common and abundant, and available for viewing by persons with that interest. Mitigation measures to reduce potential adverse impacts to DCCOs and other wildlife are provided in 3.4 of the EA. By adhering to these mitigation measures, WS DCCO management actions will not have a significant impact on wildlife populations in Michigan.

Issue 20: WS implementation of control efforts could have adverse effects on communal nesting bird species, and threatened and endangered species (non-target species). (This issue is a result of comments received from a conservation organization; 3 animal protection organizations; and university researcher).

Program Response 20: These potential effects were analyzed in the DCCO EIS (Sections 4.2.3 and 4.2.5). As that analysis concluded, and as further described in Section 4.1.2, WS impacts on non-target species are predicted to be minimal and should not affect the overall populations of any non-target species. WS personnel are trained and experienced to select the most appropriate method for taking target animals and excluding nontargets. Methods used by WS would be highly selective with very little risk to non-target species. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS's CDM methods, except for the occasional scaring from harassment devices and when WS conducts breeding DCCO management in mixed-species waterbird colonies. Mitigation measures to eliminate or reduce impacts to non-target species, including nesting colonial waterbird species, are listed in Section 3.4. Furthermore, as described in Section 4.1.2, WS has determined that cormorant damage management activities in Michigan will not adversely impact any Federally or State listed T&E species.

Issue 21: The EA should have considered an alternative that prohibited the lethal control of any DCCO, but permitted and expanded egg-oiling and nest destruction activities. (This issue is a result of comments received from an animal protection organization).

Program Response 21: As stated in Chapter 7 of the USFWS FEIS (USFWS 2003), there is no significant qualitative difference between an entirely "non-lethal" alternative, as analyzed in the FEIS and the EA (Alternative 2), and an alternative that allows destruction of eggs but not of adult or juvenile DCCOs. A nonlethal approach to managing DCCO damage is analyzed in detail in the EA as Alternative 2 (Non-lethal CDM Only by WS).

Issue 22: The EA did not to included relevant information from Cuthbert et al (2002) and Trexel (2002). (This issue is a result of comments received from a conservation organization; 2 animal protection organizations; and a university researcher).

Program Response 22: Information from these citations has been added to Sections 1.2.2; 1.2.3; and 4.1.1.

Issue 23: Two commenters requested to have their names removed from the list of persons consulted during the preparation of the EA. (This issue is a result of comments received from 2 university researchers).

Program Response 23: These two names have been removed form the list of persons consulted in Chapter 5. However, their comments were seriously considered and a number of changes or additions have been made to the EA as a result of them. WS and USFWS welcome input from these respected researchers and hope that they will continue to provide their comments and advise on this subject.

Issue 24: According to remarks made at a public meeting by the Michigan WS State Director, the Michigan WS program has apparently already decided to adopt the preferred alternative and begin DCCO control at the Les Cheneaux Islands rendering the draft EA public comment period meaningless. (This issue is a result of comments received from a conservation organization).

Program Response 24: The commentor here is making reference to a news article that came out on March 28, 2004 after the MI WS State Director gave a presentation on potential DCCO management programs that may occur in Michigan. This presentation was given prior to the pre-decisional EA being finalized and released to the public for review and comment. It is correct that the project that was discussed (Les Cheneaux Islands) at this meeting is considered part of the proposed action analyzed in the EA. However,

as allowed under CEQ NEPA regulations (40 CFR 1502.14 (e)), identifying a preferred alternative in the pre-decisional EA is appropriate, especially if it allows the reader a better understanding of what the proposed program will entail. The pre-decisional EA was prepared and released to the public for a 31-day comment period by a legal notice in *The Detroit News* and the *Detroit Free Press* on April 4, 2004. A notice of availability of pre-decisional EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. The USFWS Region 3 office also placed a notice of availability of the pre-decisional EA on their website (http://midwest.fws.gov/NEPA/MIcormorant/index.html). All comments were analyzed to identify substantial new issues, alternatives, or to redirect the program.

Issue 25: According to remarks made at a public meeting by the Michigan WS State Director, the Michigan WS program is planning to reduce the population of DCCO in the Les Cheneaux Islands from 15,000 to 2,000 birds within 6 to 10 years. An effort will be made to kill more than 15% or more of the adults and reduce reproduction from 100% to 10% by spraying eggs and other techniques. (This issue is a result of comments received from a conservation organization).

Program Response 25: The commentor here is making reference to a news article that came out on March 28, 2004 after the MI WS State Director gave a presentation on potential DCCO management programs that may occur in Michigan. WS has made no decision with regard to a population goal for DCCOs in the Les Cheneaux Island and set no timetable to achieve a goal. No such goal or timetable was announced publicly. In developing plans for potential pilot project, the prospective goal of reducing reproduction by egg oiling as much as possible was seen as reasonable within the PRDO. It was recognized that reducing reproduction completely was unlikely as a matter of practicality and that reducing it to 10% was more realistic. Likewise, the potential pilot project also contained a component to remove a certain percentage of breeding adults as allowed by the PRDO. This combination of egg oiling and removal of adults was demonstrated to be effective in Quebec (Bedard et al. 1999). DCCO management actions (killing of adult birds and egg oiling) that may be taken in the Les Cheneaux Island region will be within the level of take predicted and analyzed in Section 4.1.1. The DCCO FEIS predicts that authorized take of cormorants and their eggs for the management of double-crested cormorant damage, including those taken in Michigan, is anticipated to have no significant impact on regional or continental double-crested cormorant populations (USFWS 2003). This includes DCCOs that may be killed in Michigan under the PRDO by WS, MDNR, and Indian Tribes; and those taken under USFWS issued permits. DCCOs are a long-lived bird and egg oiling programs are anticipated to have minimal effects on regional or continental cormorant populations (USFWS 2003).

Issue 26: It was publicly stated by the Michigan WS State Director that 1) the Michigan WS is unsure of the potential impacts of the proposed program in the Les Cheneaux Islands; 2) the program will be made up as it goes along; 3) it is the first of it's kind in North America to control the cormorant in an enivironment like Les Cheneaux; 4) the WS program is unsure if birds from other areas would simply replace those which had been eliminated. Such statements as this indicate that the EA process is tainted and based on WS 's statements, a NEPA EIS is needed for such a broad-scale "pioneering pilot program" that WS will be making up as it goes along for DCCO population controls to theoretically resolve a fishery conflict. (This issue is a result of comments received from a conservation organization).

Program Response 26: The commentor here is making reference to a news article that came out on March 28, 2004 after the MI WS State Director gave a presentation on potential DCCO management programs that may occur in Michigan. Many of the comments above have been taken out of context from what was presented at this meeting. The potential impacts of the proposed program in the Les Cheneaux Islands have been analyzed as part of the proposed program alternative (Alternative1). In making an informed decision of potential environmental impacts, WS used the best available scientific information, data and expert advice, including the DCCO FEIS (USFWS 2003). As allowed under CEQ NEPA regulations, this EA is tiered to the DCCO FEIS. Appendix A provides a list of documents that are used and referenced throughout the EA for analyzing potential impacts of the proposed program; Chapter 5 provides a list of the

persons consulted in the development of the EA; and potential impacts are systematically analyzed in Chapter 4. Each issue is fully explained and analyzed against each alternative to allow the reader an objective way to evaluate potential outcomes of each alternative. By conducting such a systematic and objective analysis, and using the best available scientific information, data and expert advice, WS is able to make an informed decision as required by NEPA.

WS has determined that the analysis in the EA showed no significant impact on the quality of the human environment. The EA took a hard look at the need for action, the issues, alternatives, and environmental consequences, and resulted in a FONSI that discussed, under each of the ten CEQ points of significance, why each was not significant. WS carefully considered all comments from respondents to the public involvement efforts. The agency followed CEQ NEPA regulations, and Agency NEPA implementing procedures. Thus, the EA resulted in a FONSI that specified why an EIS was not required.

Issue 27: WS should employ all possible methods to control DCCO damage, including the shooting of adult birds and oiling of their eggs. WS should use the authority provided to them under the PRDO to protect public resources in Michigan. WS should implement an IWDM approach to reduce damage associated with DCCOs on property, economy, and public health and safety in affected communities. (This issue is a result of comments received from a US Congressman; the Michigan DNR; the City of Alpena; 6 Lake/Fishing Associations; and 5 private citizens).

Program Response 27: As described in Section 3.1.1, this is the proposed action alternative (Alternative 1). WS considers such approaches as part of the proposed program and will make these types of recommendations or take such actions when determined practical and effective for a given situation.

Issue 28: While not specifically required under NEPA, when mentioning consideration of Federally-listed species it would be appropriate to mention State-listed species at the same point in Section 3.4.2 (Additional Mitigation Specific to the Issues). (This issue is a result of comments received from the Michigan DNR).

Program Response 28: Mitigation measures to reduce potential impacts to State listed T&E species have been added to this section of the EA.

Issue 29: The EA makes no mention of the tremendous stench that is caused by DCCO feces. (This issue is a result of comments received from a private citizen).

Program Response 29: Although not specifically mentioned in Section 1.2.4, WS recognizes that DCCOs may cause this type of damage on a site specific basis. If WS receives such a type of request for assistance, WS will take the appropriate action determined practical and effective for the given situation.

Issue 30: The EA makes no mention of the adverse impacts that the DCCO may have on nesting terns and bald eagles in Michigan. (This issue is a result of comments received from a private citizen).

Program Response 30: Although these two bird species are not specifically mentioned in Section 1.2.3, WS recognizes that DCCOs may cause adverse impacts to a variety of bird species on a site specific basis. If WS receives such a type of request for assistance, WS will take the appropriate action determined practical and effective for the given situation.

APPENDIX A

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APPENDIX B SPECIES THAT ARE FEDERALLY LISTED AS THREATENED OR ENDANGERED IN THE STATE OF MICHIGAN

(T=Threatened, E=Endangered)

Animals

E	Bat, Indiana (Myotis sodalis)
\mathbf{E}	Beetle, American burying (Nicrophorus americanus)
E	Beetle, Hungerford's crawling water (Brychius hungerfordi)
E	Butterfly, Karner blue (Lycaeides melissa samuelis)
E	Butterfly, Mitchell's satyr (Neonympha mitchellii mitchellii)
E	Clubshell Entire Range; Except where listed as Experimental Populations (Pleurobema clava)
T	Eagle, bald (lower 48 States) (Haliaeetus leucocephalus)
E	Plover, piping (Great Lakes watershed) (Charadrius melodus)
E	Puma (=cougar), eastern (Puma (=Felis) concolor couguar)
E	Riffleshell, northern (Epioblasma torulosa rangiana)
T	Snake, copperbelly water (MI, OH, IN N of 400 N. Lat.) (Nerodia erythrogaster neglecta)
E	Warbler (=wood), Kirtland's (Dendroica kirtlandii)
T	Wolf, gray Eastern Distinct Population Segment (Canis lupus)

Plants

T	Fern, American hart's-tongue (Asplenium scolopendrium var. americanum)
T	Thistle, Pitcher's (Cirsium pitcheri)
T	Daisy, lakeside (Hymenoxys herbacea)
T	Iris, dwarf lake (Iris lacustris)
T	Pogonia, small whorled (Isotria medeoloides)
Ε	Monkey-flower, Michigan (Mimulus glabratus var. michiganensis)
T	Orchid, eastern prairie fringed (Platanthera leucophaea)
T	Goldenrod, Houghton's (Solidago houghtonii)

APPENDIX C SPECIES THAT ARE STATE LISTED AS ENDANGERED AND THREATENED IN THE STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

WILDLIFE DIVISION

ENDANGERED AND THREATENED SPECIES

(By authority conferred on the department of natural resources by section 36503 of 1994 PA 451, MCL 324.36503)

R 299.1021 Mollusks.

Rule 1. (1) The following species of mollusks of class Pelecypoda (mussels) are included on the state list of endangered species:

(a) Epioblasma obliqua perobliqua (Lea)	White catspaw
[Dysnomia sulcata (Conrad)]	
(b) Epioblasma torulosa rangiana (Rafinesque)	Northern riffleshell
[Dysnomia torulosa rangiana (Lea)]	
(c) Epioblasma triquetra (Rafinesque)	Snuffbox
[Dysnomia triquetra (Rafinesque)]	
(d) Obovaria subrotunda (Rafinesque)	Round hickorynut
(e) Pleurobema clava (Lamarck)	Clubshell
(f) Simpsonaias ambigua (Say)	Salamander mussel
[Simpsoniconcha ambigua (Say)]	
(g) Toxolasma lividus (Rafinesque)	Purple lilliput
[Carunculina glans (Lea)]	
(h) Villosa fabalis (Lea)	Rayed bean
	a (1) i 1 1 il ava lint af Abronton
(2) The following species of mollusks of class Pelecy	poda (mussels) are included on the state list of threaten

- ned species:
 - Lake floater (a) Anodonta subgibbosa (Anthony) Wavyrayed lampmussel (b) Lampsilis fasciola Rafinesque
- (3) The following species of mollusks of class Gastropoda (snails) are included on the state list of endangered species:
 - Acorn ramshorn (a) Planorbella multivolvis(Case) [Helisoma multivolvis] Petoskey pondsnail
- (4) The following species of mollusks of class Gastropoda (snails) are included on the state list of threatened species:
 - Cherrystone drop (a) Hendersonia occulta (Say) Deepwater pondsnail (b) Stagnicola contracta (Currier) [Lymanaea contracta]

(b) Stagnicola petoskeyensis (Walker)

R 299.1022 Insects.

Rule 2. (1) The following species of insects are included on the state list of endangered species:

(a) Brychius hungerfordi Spangler
 (b) Catocala amestris Strecker
 (c) Neonympha mitchellii mitchellii
 (d) Nicrophorus americanus Olivier
 (e) Schinia indiana (Smith)
 (f) Schinia lucens (Morrison)
 (g) Somatochlora hineana Williamson
 Hungerford's crawling water beetle
 Hungerford's crawling water beetle
 American burying beetle
 Phlox moth
 Leadplant moth
 Hine's emerald dragonfly

(h) Speyeria idalia (Drury) Regal fritillary

(2) The following species of insects are included on the state list of threatened species:

(a) Atrytonopsis hianna Scudder Dusted skipper (b) Erynnis persius persius Scudder Persius dusky wing (c) Euphyes dukesi (Lindsey) Dukes' skipper (d) Hesperia ottoe Edwards Ottoe skipper (e) Incisalia irus Godart Frosted elfin Great Plains spittlebug (f) Lepyronia gibbosa Ball Northern blue (g) Lycaeides idas nabokovi Masters (h) Lycaeides melissa samuelis Nabakov Karner blue Powesheik skipperling (i) Oarisma powesheik (Parker) Silphium borer moth (i) Papaipema silphii Bird Lake Huron locust (k) Trimerotropis huroniana E. M. Walker

R 299.1023 Fishes.

Rule 3. (1) The following species of fishes are included on the state list of endangered species:

Redside dace (a) Clinostomus elongatus (Kirtland) Creek chubsucker (b) Erimyzon oblongus (Mitchill) Silver shiner (c) Notropis photogenis (Cope) Northern madtom (d) Noturus stigmosus Taylor Pugnose minnow (e) Opsopoeodus emiliae Hay (f) Percina shumardi (Girard) River darter Channel darter (g) Percina copelandi (Jordan) Southern redbelly dace (h) Phoxinus erythrogaster (Rafinesque)

(2) The following species of fishes are included on the state list of threatened species:

 (a) Acipenser fulvescens Rafinesque
 Lake sturgeon

 (b) Ammocrypta pellucida (Putnam)
 Eastern sand darter

 (c) Coregonus artedii Lesueur
 Cisco or lake herring

 (d) Coregonus zenithicus (Jordan and Evermann)
 Shortjaw cisco

 (e) Hiodon tergisus Lesueur
 Mooneye

 (f) Moxostoma carinatum (Cope)
 River redhorse

 (g) Stizostedion canadense (Smith)
 Sauger

(3) The following species of fishes are thought to be extirpated in Michigan, but, if rediscovered, will automatically be listed as threatened:

(a) Coregonus johannae (Wagner) Deepwater cisco

(b)	Coregonus nigripinnis (Gill)	Blackfin cisco
(c)	Coregonus reighardi (Koelz)	Shormose cisco
(d)	Notropis amblops (Rafinesque)	Bigeye chub
(e)	Notropis chalybaeus (Cope)	Ironcolor shiner
(f)	Notropis texanus (Girard)	Weed shiner
(g)	Polyodon spathula (Walbaum)	Paddlefish
(h)	Stizostedion vitreum glaucum (Hubbs)	Bluepike
(i)	Thymallus arcticus (Richardson)	Arctic grayling

R 299.1024 Amphibians.

Rule 4. (1) The following species of amphibians is included on the state list of endangered species:

Ambystoma texanum (Matthews)

Smallmouth salamander

(2) The following species of amphibians is included on the state list of threatened species:

Ambystoma opacum (Gravenhorst)

Marbled salamander

R 299.1025 Reptiles.

Rule 5. (1) The following species of reptiles are included on the state list of endangered species:

(a) Clonophis kirtlandii (Kennicott)

Kirtland's snake

(b) Nerodia erythrogaster neglecta (Conant)

Copperbelly watersnake

(2) The following species of reptiles are included on the state list of threatened species:

(a) Elaphe vulpina gloydi Conant

Eastern fox snake

(b) Clemmys guttata

(h) Tyto alba (Scopoli)

Spotted turtle

R 299.1026 Birds.

Rule 6. (1) The following species of birds are included on the state list of endangered species:

(a)	Asio flammeus (Pontoppidan)	Short-eared owl
• •	Charadrius melodus Ord	Piping plover
(c)	Dendroica discolor (Vieillot)	Prairie warbler
(d)	Dendroica kirtlandii (Baird)	Kirtland's warbler
(e)	Falco peregrinus Tunstall	Peregrine falcon
(f)	Lanius ludovicianus migrans (Palmer)	Migrant loggerhead shrike
(g)	Rallus elegans Audubon	King rail
	Tyto alba (Scopoli)	Barn owl

(2) The following species of birds are included on the state list of threatened species:

(a) Ammodramus henslowii Audubon Henslow's sparrow Long-eared owl (b) Asio otis (Linnaeus) Red-shouldered hawk (c) Buteo lineatus (Gmelin) Yellow rail (d) Corturnicops noveboracensis (Gmelin) Yellow-throated warbler (e) Dendroica dominica (Linnaeus) Merlin (f) Falco columbarius (Linnaeus) Common loon (g) Gavia immer (Brunnich)

Bald eagle (h) Haliaeetus leucocephalus (Linnaeus)

Least bittern (i) Ixobrychus exilis (Gmelin) (i) Pandion haliaetus (Linnaeus) Osprey (k) Sterna caspia Pallas Caspian tern Common term (1) Sterna hirundo Linnaeus Trumpeter swan (m) Cygnus buccinator Richardson

(3) The following species of birds are thought to be extirpated in Michigan, but, if rediscovered, will automatically be listed as threatened:

Chondestes grammacus (Say)

Lark sparrow

R 299.1027 Mammals.

Rule 7. (1) The following species of mammals are included on the state list of endangered species:

Cougar (A) Felis concolor Linnaeus Lynx (B) Lynx canadensis Kerr Prairie vole (C) Microtus ochrogaster (Wagner) (D) Myotis sodalis Miller and Allen Indiana bat

(2) The following species of mammals are included on the state list of threatened species:

(A) Canis lupus Linnaeus

Gray wolf

(B) Cryptotis parva (Say)

Least shrew

R 299.1028 Plants.

Rule 8. (1) The following species of plants are included on the state list of endangered species:

Gattinger's gerardia (a) Agalinas gattingeri Small [Gerardia gattingeri Small] Skinner's gerardia (b) A. skinneriana (A. Wood) Britton [Gerardia skinneriana A. Wood] Small round-leaved orchis (c) Amerorchis rotundifolia (Pursh) Hultén Dwarf milkweed (d) Asclepias ovalifolia Dene. (e) Androsace occidentalis Pursh Rock-jasmine Heart-leaved arnica (f) Arnica cordifolia Hooker Wall-rue (g) Asplenium ruta-muraria L. (h) A. scolopendrium L. var. americana

(Fernald) Kartesz & Ghandi, Hart's-tongue fern [Phyllitis scolopendrium var. americanum Fern.] Cream wild indigo (i) Baptisia leucophaea Nutt. (j) Botrychium acuminatum W. H. Wagner Moonwort

Hudson Bay sedge (k) Carex heleonastes Ehrh. Black sedge (1) C. nigra (L.) Reichard Straw sedge (m) C. straminea Willd. American chestnut

(n) Castanea dentata (Marsh.) Borkh. Rock-rose (o) Chamaerhodos nuttallii Fern. Purple turtlehead

(p) Chelone obliqua L. American rock-brake

(q) Cryptogramma acrostichoides R. Br. Fairy bells (r) Disporum hookeri (Torrey) Nicholson

Shooting star (s) Dodecatheon meadia L. Smooth whitlow grass

(t) Draba glabella Pursh. Dwarf burhead (u) Echinodorus tenellus (Mart.) Buchenau

Purple spike rush (v) Eleocharis atropurpurea (Retz.) Kunth Small-fruited spike-rush (w) E. microcarpa Torrey Slender spike rush (x) E. nitida Fern. White gentian (y) Gentiana flavida A. Gray [G. alba Muhl.] Downy gentian (z) G. puberulenta J. Pringle [G. puberula Michaux] (aa)Gymnocarpium jessoense (Koidz.) Koidz. Northern oak fern Alpine sainfoin (bb)Hedysarum alpinum L. (cc)Hymenoxys herbacea (Greene) Cusick Lakeside daisy [Hymenoxys acaulis var. glabra (Gray) Parker Engelmann's quillwort (dd)Isoetes engelmannii A. Braun Smaller whorled pognia (ee)Isotria medeoloides (Pursh) Raf. Climbing fern (ff)Lygodium palmatum (Bernh.) Sw. (gg)Mimulus glabratus var. michiganensis (Pennell) Fassett Michigan monkey flower (hh)Nuphar pumila (Timm) DC. Small yellow pond lily [N. microphylla (Pers.) Fern.] Pygmy water lily (ii)Nymphaea tetragona Georgi Fragile prickly pear (ii)Opuntia fragilis (Nutt.) Haw. Many-flowered panic grass (kk)Panicum polyanthes Schultes Slender beard tongue (ll)Penstemon gracilis Nutt. Prairie white-fringed orchid (mm)Platanthera leucophaea (Nutt.) Lindley [Habenaria leucophea (Nutt.) A. Gray] Heart-leaved plantain (nn)Plantago cordata Lam. Canbyi's bluegrass (00)Poa canbyi (Scribner) Piper Swamp or Black cottonwood (pp)Populus heterophylla L. Mermaid-weed (qq)Proserpinaca pectinata Lam. Globe beak-rush (rr)Rhynchospora globularis (Chapman) Small Dwarf raspberry (ss)Rubus acaulis Michaux Western dock (tt)Rumex occidentalis S. Wats Few-flowered nut rush (uu)Scleria pauciflora Willd. Awlwort (vv)Subularia aquatica L. Painted trillium (ww)Trillium undulatum Willd. Floating bladderwort (xx)Utricularia inflata Walter [U. radiata Small]

(2) The following species of plants, listed by major group and family, are included on the state list of threatened species:

(a) PTERIDOPHYTES:

(yy)Vaccinium vitis-idaea L.

(i) ASPLENIACEAE (Spleenwort Fanily):

(A) Asplenium rhizophyllum L.

[Camptosorus rhizophyllus (L.) Link]

(B) A. trichomanes-ramosum L. [A. viride Hudson]

Walking fern

Green spleenwort

Mountain cranberry

(ii)DRYOPTERIDACEAE (Wood Fern Family):

(A) Dryopteris celsa (W. Palmer) Small

(B) Gymnocarpium robertianum (Hoffman) Newman

(C) Woodsia alpina (Bolton) S. F. Gray

(D) W. obtusa (Sprengel) Torrey

Small log fern Limestone oak fern

Northern woodsia Blunt-lobed woodsia

(iii)LYCOPODIACEAE (Clubmoss family):

Lycopodiella margaritae

J. G. Bruce, W. H. Wagner, & Beitel

Clubmoss

(iv)OPHIOGLOSSACEAE (Adder's-tongue family): Prairie Moonwort or Dunewort (A) Botrychium campestre W. H. Wagner (B) B. hesperium (Maxon & Clausen) W. H. Wagner & Lellinger Western moonwort (C) B. mormo W. H. Wagner Goblin moonwort (D) Ophioglossum vulgatum L. [O. pycnostichum (Fern.) Löve & Löve] Southeastern adder's-tongue (v) PTERIDACEAE (Maidenhair Fern Family) Purple cliff brake Pellaea atropurpurea (L.) Link. (b) MONOCOTYLEDONS: (i) ALISMATACEAE (Water-plantain family): Arrowhead Sagittaria montevidensis Cham. & Schlecht. (ii) CYPERACEAE (Sedge family): (A) Carex albolutescens Schw. Sedge (B) C. assiniboinensis W. Boott Assiniboia sedge Sedge (C) C. atratiformis Britton (D) C. conjuncta F. Boott. Sedge Raven's-foot sedge (E) C. crus-corvi Kunze (F) C. lupuliformis Dewey False hop sedge Sedge (G) C. media R. Br. New England sedge (H) C. novae-angliae Schwein. (I) C. oligocarpa Willd. Eastern few-fruited sedge (J) C. platyphylla Carey Broad-leaved sedge (K) C. rossii Boott Ross's sedge (L) C. scirpoidea Michaux Bulrush sedge Sedge (M) C. seorsa Howe Cattail sedge (N) C. typhina Michaux Wiegand's sedge (O) C. wiegandii Mackenzie (P) Eleocharis geniculata (L.) R & S. [E.caribaea (Rottb.) S. F. Blake] Spike rush Flattened spike rush (Q) E. compressa Sulliv. (R) E. parvula (R. & S.) Link. Dwarf spike rush (S) E. tricostata Torrey Three-ribbed spike rush Umbrella grass (T) Fuirena squarrosa Michaux Bald rush (U) Psilocarya scirpoides Torrey (V) Scirpus hallii A. Grav Hall's bulrush (W) S. americanus Pers. [S. olneyi A. Gray] Olney's bulrush (X) Scleria reticularis Michaux Netted nut rush (iii) IRIDACEAE (Iris family): Dwarf lake iris (A) Iris lacustris Nutt. (B) Sisyrinchium atlanticum Bickn. Atlantic blue-eyed-grass (iv) JUNCACEAE (Rush family): Short-fruited rush (A) Juneus brachycarpus Engelm. Bayonet rush (B) J. militaris Bigelow Scirpus-like rush (C) J. scirpoides Lam. (D) J. stygius L. Moor rush (E) J. vaseyi Engelm. Vasev's rush

(F) Luzula parviflora (Ehrh.) Desv.

Small-flowered wood rush

(v) LEMNACEAE (Duckweed family):
Wolffia papulifera Thompson [W. brasïliensis Weddell] Watermeal

(vi) LILIACEAE (Lily family):

(A) Allium schoenoprasum L. (native variety)

(B) Camassia scilloides (Raf.) Cory

(C) Disporum trachycarpum (Wats) B. & H.

(D) Tofieldia pusilla (Michaux) Pers.

(E) Trillium nivale Riddell

(F) T. recurvatum Beck

(G) T. sessile L.

(vii) ORCHIDACEAE (Orchid family):

(A) Calypso bulbosa (L.) Oakes

(B) Cypripedium candidum Willd.

(C) Galearis spectabilis (L.) Raf.

(D) Isotria verticillata (Willd.) Raf.

(E) Platanthera ciliaris (L.) Lindley [Habenaria ciliaris (L.) R. Br.]

(F) Spiranthes ovalis Lindley

(G) Tipularia discolor (Pursh) Nutt.

(H) Triphora trianthophora (Sw.) Rydb.

(viii)POACEAE (Grass family):

(A) Aristida longespica Poiret

(B) A. tuberculosa Nutt.

(C) Beckmannia syzigachne (Steudel) Fern.

(D) Bouteloua curtipendula (Michaux)

(E) Bromus pumpellianus Scribner

(F) Calamagrostis lacustris (Kearney) Nash

(G) C. stricta (Timm) Koeler

(H) Chasmanthium latifolium (Michx.) Yates [Uniola latifolia Michaux]

(I) Diarrhena americana Beauv.

(J) Festuca scabrella Torrey [F. altaica Trin.]

(K) Muhlenbergia richardsonis (Trin.) Rydb.

(L) Oryzopsis canadensis (Poiret) Torrey

(M) Panicum leibergii (Vasey) Scribner

(N) P. longifolium Torrey

(O) P. verrucosum Muhl.

(P) Poa alpina L.

(Q) P. paludigena Fern. & Wieg.

(R) Zizania aquatica var. aquatica L.

(ix) POTAMOGETONACEAE (Pondweed family):

(A) Potamogeton bicupulatus Fern.

[P. capillaceus Poiret]

(B) P. hillii Morong

(C) P. pulcher Tuckerman

(D) P. vaseyi Robins

(x) RUPPIACEAE (Widgeon grass family):

Ruppia maritima L.

Chives

Wild hyacinth

Northern fairy bells

False asphodel

Snow trillium

Prairie trillium

Toadshade

Calypso or fairy-slipper

White lady slipper

Showy orchis

Whorled pogonia

Orange- or yellow-fringed orchis

Lesser ladies'-tresses

Cranefly orchid

Nodding pogonia or three birds orchid

Three-awned grass

Beach three-awned grass

Slough grass

Torrey Side oats grama

Pumpelly's bromegrass

Northern reedgrass

Narrow-leaved reedgrass

Wild oats

Beak grass

Rough fescue

Mat muhly

Canada rice grass

Leiberg's panic grass

Panic grass

Warty panic grass

Alpine bluegrass

Bog bluegrass

Dog Didograde

Wild rice

Waterthread pondweed

Hill's pondweed

Spotted pondweed

Vasey's pondweed

Widgeon grass

(viii)BRASSICACEAE (Mustard family): Rock cress (A) Arabis perstellata E. L. Braun (B) Armoracia lacustris (A. Gray) Al-Shehbaz & V. Bates Lake cress [A. aquatica (Eaton Wiegand)] (C) Braya humilis (C. A. Meyer) Robinson Low northern rock cress Large toothwort (D) Dentaria maxima Nutt. Ashy whitlow grass (F) Draba cana Rydb. Twisted whitlow grass (G) D. incana L. Creeping whitlow grass (H) D. reptans (Lam.) Fern. (ix) CALLITRICHACEAE (Water-starwort family): Large water starwort Callitriche heterophylla Pursh (x) CAPRIFOLIACEAE (Honeysuckle family): (A) Lonicera involucrata (Richardson) Banks Black twinberry (B) Viburnum edule (Michx.) Raf. Squashberry or mooseberry (xi) CARYOPHYLLACEAE (Pink family): Large-leaved sandwort (A) Arenaria macrophylla Hooker Pearlwort (B) Sagina nodosa (L.) Fenzl Starry campion (C) Silene stellata (L.) Aiton f. Fire pink (D) S. virginica L. Fleshy stitchwort (E) Stellaria crassifolia Ehrh. (xii) CISTACEAE (Rockrose family): Leggett's pinweed Lechea pulchella Raf. [L. leggettii Britton & Hollick] (xiii) CONVOLVULACEAE (Morning-glory family): Wild potato vine or man-of-the-earth Ipomoea pandurata (L.) G. F. W. Meyer (xiv) EMPETRACEAE (Crowberry family): Black crowberry Empetrum nigrum L. (xv) ERICACEAE (Heath family): Pine-drops (A) Pterospora andromedea Nutt. Dwarf bilberry (B) Vaccinium cespitosum Michaux (C) V. uliginosum L. Alpine blueberry (xvi) EUPHORBIACEAE (Spurge family): Tinted spurge Euphorbia commutata Engelm. (xvii) FABACEAE (Pea family): Canadian milk vetch (A) Astragalus canadensis L. Wisteria (B) Wisteria frutescens (L.) Poiret (xviii) FUMARIACEAE (Fumitory family): Yellow fumewort Corydalis flavula (Raf.) DC. (xix) GENTIANACEAE (Gentian family): Panicled screwstem (A) Bartonia paniculata (Michaux) Muhl. Narrow-leaved gentian (A) Gentiana linearis Froel. Stiff gentian (B) Gentianella quinquefolia (L.) Small Rosepink (C) Sabatia angularis (L.) Pursh

(xx) HALORAGACEAE (Water-milfoil family):
Myriophyllium farwellii Morong
Farwell's water milfoil
(xxi) HYDROPHYLLACEAE (Waterleaf family):

(xxii) HYPERICACEAE (St. John's-wort family):

Hypericum sphaerocarpum Michaux Round-fruited St. John's-wort

Franklin's phacelia

(xxiii) LAMIACEAE (Mint family):
(A) Lycopus virginicus L. Virginia w

Phacelia franklinii (R. Br.) A. Gray

(A) Lycopus virginicus L. Virginia water-horehound
(B) Pycnanthemum muticum (Michx.) Pers. Mountain mint

(C) P. pilosum Nutt. Hairy mountain mint

(D) Scutellaria nervosa Pursh
 (E) S. parvula Michaux [sensu lato]
 (F) Trichostema brachiatum L.

[Isanthus brachiatus (L.) BSP.] False pennyroyal

(G) T. dichotomum L. Bastard pennyroyal

(xxiv) LENTIBULARIACEAE (Bladderwort family):
Utricularia subulata L. Bladderwort

(xxv) LINACEAE (Flax family):
Linum virginianum L. Virginia flax

(xxvi) MELASTOMATACEAE (Melastome family):
Rhexia mariana L.

Maryland meadow beauty

(xxvii) MORACEAE (Mulberry Family):
Morus rubra L. Red mulberry

(xxviii) NYMPHAEACEAE (Water-lily family):
Nelumbo lutea (Willd.) Pers.

[N. pentapetala (Walter) Fern.]

American lotus

(xxix) OLEACEAE (Olive family):
Fraxinus profunda (Bush) Bush
[F. tomentosa F. Michaux] Pumpkin ash

(xxx) ONAGRACEAE (Evening-primrose family):
Ludwigia sphaerocarpa Ell.
Globe-fruited seedbox

(xxxi) OROBANCHACEAE (Broom-rape family):
Orobanche fasciculata Nutt.

Broomrape

(xxxii) OXALIDACEAE (Wood-sorrel family):
Oxalis violacea L.

Violet wood sorrel

(xxxiii) POLEMONIACEAE (Phlox family):
(A) Phlox bifida Beck.
(B) P. maculata L.

Cleft phlox
Wild sweet William

(B) P. maculata L. Wild sweet William (C) Polemonium reptans L. Jacob's ladder

(xxxiv) POLYGONACEAE (Smartweed family):

Carey's smartweed (A) Polygonum careyi Olney (B) P. viviparum L. Alpine bistort (xxxv) RANUNCULACEAE (Crowfoot family): Goldenseal (A) Hydrastis canadensis L. Spearwort (B) Ranunculus ambigens Watson Seaside crowfoot (C) R. cymbalaria Pursh Lapland buttercup (D) R. lapponicus L. Macoun's buttercup (E) R. macounii Britton Prairie buttercup (F) R. rhomboideus Goldie (xxxvi) RHAMNACEAE (Buckthorn family): Wild lilac Ceanothus sanguineus Pursh (xxxvii) RUBIACEAE (Madder family): Bedstraw Galium kamtschaticum Schultes & J. H. Schultes (xxxviii) ROSACEAE (Rose family): False violet (A) Dalibarda repens L. Oueen-of-the-prairie (B) Filipendula rubra (Hill) Robinson Prairie smoke (C) Geum triflorum Pursh Bowman's root (D) Porteranthus trifoliatus (L.) Britton [Gillenia trifoliata (L.) Moench.] Sand cinquefoil (E) Potentilla paradoxa Nutt. Prairie cinquefoil (F) P. pensylvanica L. Canadian burnet (G) Sanguisorba canadensis L. (xxix) SALICACEAE (Willow family): Tea-leaved willow Salix planifolia Pursh (xl) SARRACENIACEAE (Pitcher-plant family): Yellow pitcher plant Sarracenia purpurea f. heterophylla (Eaton) Fern. (xli) SAXIFRAGACEAE (Saxifrage family): Marsh grass-of-parnassus (A) Parnassia palustris L. (B) Saxifraga paniculata Miller [S. aizoön Jacq.] Encrusted saxifrage Prickly saxifrage (C) S. tricuspidata Rottb. (xliii) SCROPHULARIACEAE (Figwort family): Kitten-tails (A) Besseya bullii (Eaton) Rydb. Pale Indian paintbrush (B) Castilleja septentrionalis Lindley Small blue-eyed Mary (C) Collinsia parviflora Lindley Mullein foxglove (D) Dasystoma macrophylla (Nutt.) Raf. (E) Euphrasia hudsoniana Fernald & Weigand Eyebright (F) E. nemorosa (Pers.) Wallr. Eyebright (G) Gratiola aurea Pursh)[G. lutea Raf.] Hedge-hyssop Annual hedge hyssop (H) G. virginiana L. (I) Penstemon calycosus Small Beard tongue (xliii) VALERIANACEAE (Valerian family): (A) Valeriana edulis var. ciliata (T. & G.) Cronquest Edible valerian Goosefoot corn salad (B) Valerianella chenopodiifolia (Pursh) DC.

(C) V. umbilicata (Sull.) A. W. Wood

Corn salad

(xliv) VIOLACEAE (Violet family):

(A) Viola epipsila Ledeb. (B) V. novae-angliae House (C) V. pedatifida G. Don

Northern marsh violet New England violet Prairie birdfoot violet

Frost grape

(xlv) VITACEAE (Grape family)

Vitis vulpina L.

(3) This rule does not apply to cultivated plants.

(4) The following species of plants are thought to be extirpated in Michigan, but, if rediscovered, will automatically be listed as threatened:

(a) Agropyron spicatum (Pursh) Scribner & J.G. Smith Bluebunch wheatgrass Three-awned grass (b) Aristida dichotoma Michaux Mountain spleenwort (c) Asplenium montanum Willd. Bluehearts (d) Buchnera americana L. Log sedge (e) Carex decomposita Muhl. (f) C gravida Bailey Sedge Hayden's sedge (g) C. haydenii Dewey Slender dayflower (h) Commelina erecta L.

(i) Cyperus acuminatus Torrey & Hooker Cyperus,

(i) Dalea purpurea Vent.

[Petalostemon purpurem (Vent.) Rydb.] (k) Dennstaedtia punctiloba (Michx.) T. Moore

(l) Digitaria filiformis (L.) Koeler

(m) Disporum maculatum (Buckley) Britton

(n) Draba nemorosa L.

(o) Eleocharis radicans (Poiret) Kunth (p) Echinacea purpurea (L.) Moench. (q) Equisetum telmateia Ehrh.

(r) Fimbristylis puberula (Michaux) Vahl

(s) Gentiana saponaria L. (t) Glyceria acutiflora Torrey (u) Hedyotis nigricans (Lam.) Fosb.

(v) Helianthus microcephalus Torrey & Gray

(w) Lemna valdiviana Phil.

(x) Lespedeza procumbens Michaux

(y) Liatris punctata Hooker (z) L. squarrosa (L.) Michx. (aa) Lithospermum incisum Lehm. (bb) Mikania scandens (L.) Willd.

(cc) Mimulus alatus Aiton (dd) Monarda didyma L.

(ee) Muhlenbergia cuspidata (Hooker) Rydb.

(ff) Onosmodium molle Michx.

(gg) Phleum alpinum L. (hh) Polygala incarnata L.

(ii) Polygonatum biflorum var. melleum (Farw.)

(jj) Polytaenia nuttallii DC.

(kk) Rudbeckia subtomentosa Pursh (11) Scutellaria incana Biehler

(mm) S. ovata Hill

(nn) Senecio congestus (R. Br.) DC.

Nut grass

purple prairie clover

Hay-scented fern Slender finger grass Nodding madarin Whitlow grass Spike rush

Purple coneflower Giant horsetail Chestnut sedge Soapwort gentian Manna grass Hedvotis

Small wood sunflower Pale duckweed Trailing bush clover Dotted blazing star Plains blazing star Narrow-leaved puccoon

Mikania

Winged monkey flower Bee balm, Oswego tea

Plains muhly Marbleweed Mountain timothy Pink milkwort

Ownbey Honey-flowered solomon seal

Prairie parsley Sweet coneflower Skullcap

Forest skullcap Marsh fleabane

- (00) Sisyrinchium farwellii Bickn.
- (pp) S. hastile Bickn.
- (qq) Tomanthera auriculata (Michaux) Raf. [Agalinas auriculata (Michaux) S. F. Blake]
- (rr) Tradescantia bracteata Small.
- (ss) Trillium viride Beck
- (tt) Woodwardia areolata (L.) T. Moore

Farwell's blue-eyed grass Blue-eyed grass

Eared foxglove Long-bracted spiderwort Green trillium Netted chain fern

APPENDIX D LOCATIONS OF DOUBLE-CRESTED CORMORANT BREEDING COLONIES ON PUBLIC LANDS IN THE STATE OF MICHIGAN

(USDI/USGS 2001, Wires et. al. 2001)

Colony Site Name	Nearest City/Town
Crow Island	Cedarville, MI
East Grape Island	St. James, MI
Gull Island LM	St. James, MI
Hat Island	St. James, MI
Huron Island	Huron Mountain, MI
IR Amygdaloid Island	Silver Islet, ON
IR Gull 2	Silver Islet, ON
IR Net Island	Silver Islet, ON
IR North Rock	Crooks, ON
IR Paul Island Rocks	Crooks, ON
IR Steamboat Island	Silver Islet, ON
Little Charity Island	Au Gres, MI
Morazan	Glen Arbor, MI
Naubinway Island	Naubinway, MI
Pismire Island	St. James, MI
Scarecrow Island	Ossineke, MI
Snake Island BD Noc	Cheboygan, MI
St. Martin's Shoal	Hessel, MI
West Grape Island	St. James, MI

APPENDIX E

USFWS FINAL RULING AND RECORD OF DECISION ON DOUBLE-CRESTED CORMORANT MANAGEMENT

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 21

RIN 1018-AI39

Migratory Bird Permits; Regulations for Double-Crested Cormorant Management

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule and notice of record of decision.

SUMMARY: Increasing populations of the double-crested cormorant have caused biological and socioeconomic resource conflicts. In November 2001, the U.S. Fish and Wildlife Service (Service or we) completed a Draft Environmental Impact Statement (DEIS) on double-crested cormorant management. In March 2003, a proposed rule was published to establish regulations to implement the DEIS proposed action, Alternative D. In August 2003, the notice of availability for a Final Environmental Impact Statement (FEIS) was published, followed by a 30-day comment period. This final rule sets forth regulations for implementing the FEIS preferred alternative, Alternative D (establishment of a public resource depredation order and revision of the aquaculture depredation order). It also provides responses to comments we received during the 60-day public comment period on the proposed rule. The Record of Decision (ROD) is also published here.

DATES: This final rule will go into effect on [insert date 30 days following date of publication in the Federal Register].

ADDRESSES: Comments can be mailed to the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, MBSP-4107, Arlington, Virginia 22203; or emailed to cormorants@fws.gov; or faxed to 703/358-2272.

FOR FURTHER INFORMATION CONTACT: Brian Millsap, Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service (see ADDRESSES).

SUPPLEMENTARY INFORMATION:

Background

The Service is the Federal agency with primary responsibility for managing migratory birds. Our authority is based on the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), which implements conventions with Great Britain (for Canada), Mexico, Japan, and Russia. The double-crested cormorant (DCCO) is Federally protected under the 1972 amendment to the Convention for the Protection of Migratory Birds and Game Mammals, February 7, 1936, United States—Mexico, as amended, 50 Stat. 1311, T.S. No. 912. The take of DCCOs is strictly prohibited except as authorized by regulations implementing the MBTA.

As we stated in the proposed rule published in the Federal Register in March 2003, the authority for the regulations set forth in this rule is the MBTA. The MBTA authorizes the Secretary, subject to the provisions of, and in order to carry out the purposes of, the applicable conventions, to determine when, if at all, and by what means it is compatible with the terms of the conventions to allow the killing of migratory birds. DCCOs are covered under the terms of the Convention for the Protection of Migratory Birds and Game Mammals with Mexico. The DCCO is a nongame, noninsectivorous bird for which the applicable treaty does not impose specific prohibitions or

Michigan Cormorant Environmental Assessment

requirements other than the overall purpose of protection so as not to be exterminated and to permit rational utilization for sport, food, commerce, and industry. In the FEIS for this action, the Service has considered all of the statutory factors as well as compatibility with the provisions of the convention with Mexico. The Russian convention (Convention between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment, concluded November 19, 1976) provides an authority to cover DCCOs even though not listed in the Appendix. To the extent we choose to apply the convention, it contains an exception from the prohibitions that may be made for the protection against injury to persons or property. We note, therefore, that there is no conflict between our responsibility for managing migratory birds and our selected action.

Regulations governing the issuance of permits for migratory birds are contained in title 50, Code of Federal Regulations, parts 13 and 21. Regulations in subpart D of part 21 deal specifically with the control of depredating birds. Section 21.41 outlines procedures for issuing depredation permits. Sections 21.43 through 21.47 deal with special depredation orders for migratory birds to address particular problems in specific geographical areas. Section 21.47 addresses DCCOs at aquaculture facilities.

While the Service has the primary responsibility for regulating DCCO management, on-the-ground management activities are largely carried out by entities such as State fish and wildlife agencies, the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS/WS), and, in some cases, by private citizens. APHIS/WS was a cooperating agency in the development of the DEIS and FEIS. Additionally, States and Canadian provinces were involved through the International Association of Fish and Wildlife Agencies.

On March 17, 2003 we published a proposed rule in the Federal Register (68 FR 12653). We solicited comments on the proposed rule until May 16, 2003. During that time, we received approximately 9,700 letters, emails, and faxes. About 85 percent of these comments were opposed to the proposed action, the vast majority of which were driven by mass email/letter campaigns promoted by nongovernmental organizations.

This final rule reflects consideration of comments received on the proposed rule. The final rule promulgates regulations to implement the selected action described in the FEIS. We published the notice of availability for the FEIS in the Federal Register on August 11, 2003 (68 FR 47603). Copies of the FEIS may be obtained by writing us (see ADDRESSES) or by downloading it from our website at

http://migratorybirds.fws.gov/issues/cormorant/cormorant.html. The Wires et al. report "Status of the double-crested cormorant in North America," mentioned in a Federal Register notice of November 8, 1999 (64 FR 60828), may also be downloaded at http://migratorybirds.fws.gov/issues/cormorant/status.pdf.

The FEIS examined six management alternatives for addressing conflicts with DCCOs: (A) No Action, (B) Nonlethal Control, (C) Increased Local Damage Control, (D) Public Resource Depredation Order, (E) Regional Population Reduction, and (F) Regulated Hunting. The selected action in the FEIS is Alternative D, Public Resource Depredation Order. This alternative is intended to enhance the ability of resource agencies to deal with immediate, localized DCCO damages by giving them more management flexibility.

To address DCCO populations from a broader and more coordinated perspective, a population objectives approach will likely need to be considered over the long term. In the future, if supported by biological evidence and appropriate monitoring resources, the Service may authorize management that focuses on setting and achieving regional population goals. At that time, a cormorant management plan will be developed. Until then, our strategy will continue to focus on alleviating localized damages.

We acknowledge that there is a need for more information about DCCOs and their impacts on resources across a variety of ecological settings. We also recognize that more rigorous monitoring efforts would be helpful in thoroughly assessing the impacts of the selected action on DCCO populations. While DCCO populations are currently tracked by a number of regional and national surveys, the Service concurs with many reviewers of the proposed rule, and recognizes that better information on population status and trends is desirable. For this reason, consistent with program, Service, and Department goals and priorities and subject to available funds, the Service intends to use all reasonable means to implement an improved DCCO population monitoring program of sufficient

rigor to detect meaningful population changes subsequent to implementation of this action. The Service's objective will be to use available resources to collect data that can be used to reassess the population status of DCCOs by 2009, in advance of a decision whether or not to extend the depredation orders. This assessment may involve a Service- sponsored technical workshop, with various agency and non-governmental representatives, to discuss optimum survey methodologies. Also as part of that assessment, we will compile and evaluate available data on population trends of other species of birds that nest or roost communally with DCCOs to determine if negative impacts might be occurring to these species.

The Service has weighed these deficiencies against the costs of taking no action, and we believe it is prudent to move forward as outlined in this final rule. In making a decision about whether or not to extend the depredation orders, the Service will review and consider all additional research that has been conducted that evaluates the effects of the proposed action on fish stocks and other resources. The Service strongly encourages all stakeholders to assist in gathering the needed data through well-designed scientific research. Our expectation is that the annual reports in the depredation orders, especially the monitoring and evaluation data associated with the public resource depredation order, will provide substantive increases in scientific and management knowledge of DCCOs and their impacts. We urge States, Tribes, and Federal agencies involved in DCCO control to, wherever possible, design monitoring programs to provide useful information on the effects of DCCO control on public resources. We also urge all relevant governmental and nongovernmental entities to work together, whenever possible, to coordinate research and management activities at the local and regional scale. In particular, the following needs exist: greater demographic information (age-specific survival/mortality, age at first breeding, reproductive output, and philopatry) for use in modeling to help predict population responses to management scenarios; region-wide surveys of DCCOs to document changes in breeding populations; assessments of DCCO-caused fish mortality in relation to other mortality factors at the local level; studies to examine mechanisms within fish populations that may buffer the effects of DCCO predation, including investigation of whether different fish life-stages or species complexes are differentially affected by DCCOs; studies to quantify the impacts of DCCOs on vegetation and other waterbirds; studies to determine how DCCO population processes respond to changes in population density resulting from control activities; and studies to address human dimensions of DCCO conflicts and possible solutions through education and outreach.

The selected action establishes a public resource depredation order in 50 CFR 21.48 and amends 50 CFR 21.47, the aquaculture depredation order that was originally created in 1998. In the proposed rule, we presented draft regulations and opened a 60-day public comment period. Differences between this final rule and the proposed rule reflect both our attentiveness to public comments and our deference to agency expertise. The chart below highlights these changes.

Proposed rule	Final rule	Justification
ADO¹: Winter roost control authorized from October to March	Winter roost control authorized from October to April [21.47(c)(2)]	Public and agency comments indicate that DCCOs continue to congregate in large numbers in April and these birds have a major impact on adjacent aquaculture facilities
Both DOs ² : Statement that take of any species protected by the Endangered Species Act (ESA) is not authorized	Same, plus conservation measures added [21.47(d)(8); 21.48(d)(8)]	In accordance with Section 7 of the ESA, we completed informal consultation; this led to development of conservation measures to avoid adverse effects to any species protected by the ESA
Both DOs: General statement that authority under depredation orders can be revoked	Added specific suspension and revocation procedures [21.47(d)(10); 21.48(d)(13)]	For consistency's sake, we believe it is important to have a revocation/ suspension process outlined
Both DOs: OMB information collection control number not	Added OMB approval number of 1018-0121 and expiration date [21.47(e); 21.48(e)]	We received this number in May 2003, after publication of proposed rule and comment period

specified		
PRDO ³ : Recipients of	This requirement removed	The proposed rule would have been more
donations of birds killed	[21.48(d)(6)(i)]	stringent than what is currently allowed in
must have a scientific		50 CFR 21.12(b) and we do not consider
collecting permit		stricter rules necessary
PRDO: Agencies must	Added an advance notification	We wanted to address concerns about there
provide a one-time notice	requirement for take of >10% of	being no opportunity for us to review, and
of their intent to act	a breeding colony [21.48(d)(9)]	even suspend, control actions before they
under the order		take place
PRDO: Annual reporting	Changed reporting period to Oct.	The State of New York requested this
period set at Sept. 1 to	1 to Sept. 30 [21.48(d)(11)]	change to better accommodate fall
Aug. 31		harassment activities
PRDO: Monitoring	Changed the word "monitor" to	This section ensures that agencies will
requirements for	"evaluate"; added requirement	consider (and take action to avoid) impacts
population level	that data from this section be	to nontarget species and will evaluate the
activities	included in annual report; and	effects of control actions at breeding
	removed (11)(iii) [21.48(d)(12)]	colonies, without being cost-prohibitive

Aquaculture Depredation Order

Population Status of the Double-Crested Cormorant

The information in this section is derived from the FEIS (to obtain a copy, see ADDRESSES). DCCOs are native to North America and range widely there. There are essentially five different breeding populations, variously described by different authors as: Alaska, Pacific Coast, Interior, Atlantic, and Southern (Hatch and Weseloh 1999, Wires et al. 2001). The continental population is estimated at 2 million birds (including breeders and nonbreeders). For the United States as a whole, according to Breeding Bird Survey (BBS) data, the breeding population of DCCOs increased at a statistically significant rate of approximately 7.5 percent per year from 1975-2002 (Sauer et al. 2003). However, growth rates for the different breeding populations vary considerably from this average.

Atlantic. Approximately 23 percent of the DCCO breeding population is found in the Atlantic region (Tyson et al. 1999), which extends along the Atlantic coast from southern Newfoundland to New York City and Long Island (Wires et al. 2001). Atlantic DCCOs are migratory and occur with smaller numbers of great cormorants. From the early 1970s to the early 1990s, the Atlantic population increased from about 25,000 pairs to 96,000 pairs (Hatch 1995). While this population declined by 6.5 percent overall in the early to mid-1990s, some colonies were still increasing during this period. The most recent estimate of the Atlantic population is at least 85,510 breeding pairs (Tyson et al. 1999).

Interior. Nearly 70 percent of the DCCO breeding population is found in the Interior region (Tyson et al. 1999), which reaches across the prairie provinces of Canada, includes the Canadian and U.S. Great Lakes, and extends west of Minnesota to southwestern Idaho (Wires et al. 2001). Interior DCCOs are strongly migratory and, in the breeding months, are concentrated in the northern prairies, with the Canadian province of Manitoba hosting the largest number of breeding DCCOs in North America (Wires et al. 2001). Additionally, large numbers of Interior DCCOs nest on or around the Great Lakes (Hatch 1995, Wires et al. 2001). Since 1970, when 89 nests were counted during a severe pesticide-induced population decline (Weseloh et al. 1995), DCCO numbers have increased rapidly in the Great Lakes, with breeding surveys in 2000 estimating 115,000 nests there (Weseloh et al. 2002). From 1990 to 1997, the overall growth rate in the Interior region was estimated at 6 percent with the most dramatic increases occurring in Ontario, Michigan, and Wisconsin. The Interior population (including Canada) numbers is at least 256,212 breeding pairs (Tyson et al. 1999).

Southern. The Southern region includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas (Wires et al. 2001). Most DCCOs in this region are winter migrants from the Interior and Atlantic regions; the number of these wintering birds has increased

² Aquaculture and Public Resource Depredation Orders

³ Public Resource Depredation Order

dramatically in recent years (Dolbeer 1991, Glahn and Stickley 1995, Jackson and Jackson 1995, Glahn et al. 2000). Surveys conducted by APHIS/WS biologists suggest that winter numbers in the delta region of Mississippi have increased by nearly 225 percent since the early 1990s (over 73,000 DCCOs were counted in the 2001-2002 winter surveys; G. Ellis, unpubl. data). Breeding DCCOs in this region are also on the rise, with some nesting occurrences representing first records and others recolonizations (Wires et al. 2001). Today, approximately 4 percent of the DCCO breeding population occurs in this region, numbering at least 13,604 breeding pairs (Tyson et al. 1999).

Pacific Coast and Alaska. Approximately 5-7 percent of North America's DCCOs are found in this population, which has approximately 27,500 nesting pairs (including Mexico) according to Carter et al. (1995b) or at least 17,084 pairs (not including Mexico) according to Tyson et al. (1999). Carter et al. (1995) documented recent increases in California and Oregon, and declines in British Columbia, Washington, and Baja California. Tyson et al. (1999) did not consider Mexican populations and calculated a decline for the entire West Coast-Alaska region. In the past 20 years, the largest increases in the region have taken place in the Columbia River Estuary, where East Sand Island supports the largest active colony along the coast with 6,390 pairs in 2000 (Carter et al. 1995b, Collis et al. 2000, Wires et al. 2001). Increases at East Sand Island coincided with declines in British Columbia, Washington, and locations in interior Oregon, and the rapid increase undoubtedly reflected some immigration from these other areas (Carter et al. 1995).

Impacts of Double-crested Cormorants on Public Resources

Fish. In order to fully understand fisheries impacts related to predation, DCCO diet must be evaluated in terms of the number of DCCOs in the area, the length of their residence in the area, and the size of the fish population of concern (Weseloh et al. 2002). While most, but not all, studies of cormorant diet have indicated that sport or other human-valued fish species do not make up high percentages of DCCO diet, conclusions about actual fisheries impacts cannot be based on diet studies alone. Nisbet (1995) referred to this as the "body-count" approach (i.e., counting the numbers of prey taken rather than examining the effects on prey populations) and noted that it is necessary to also "consider functional relationships between predation and output parameters." Stapanian (2002) observed that "Rigorous, quantitative studies suggest that the effects of cormorants on specific fisheries appear to be due in part to scale and stocks of available prey." Indeed, negative impacts are typically very site-specific and thus DCCO-fish conflicts are most likely to occur on a localized scale. Even early cormorant researcher H.F. Lewis recognized that cormorants could be a local problem at some fishing areas (Milton et al. 1995). In sum, the following statements about DCCO feeding habits and fisheries impacts can be concluded with confidence from the available science: (1) DCCOs are generalist predators whose diet varies considerably between seasons and locations and tends to reflect fish species composition; (2) The present composition of cormorant diet appears to have been strongly influenced by human-induced changes in the natural balance of fish stocks; (3) "Impact" can occur at different scales, such that ecological effects on fish populations are not necessarily the same as effects on recreational or commercial catches, or vice versa; (4) Cormorant impact is generally most significant in artificial, highly managed situations; and (5) Because environmental and other conditions vary locally, the degree of conflicts with cormorants will vary locally.

Research in New York's Oneida Lake and eastern Lake Ontario has examined data on DCCO diets and fish populations (walleye and yellow perch in Oneida Lake and smallmouth bass in Lake Ontario) and concluded that cormorant predation is likely a significant source of fish mortality that is negatively impacting recreational catch (Adams 1999, Rudstam 2000, Lantry et al. 1999). Based on these studies, the Service will allow the authorized agencies and Tribes acting under the public resource depredation order to determine whether a similar situation exists in their location, and undertake appropriate control actions to mitigate negative effects, if applicable.

Other Birds. Weseloh et al. (2002) observed that nesting DCCOs could impact other colonial waterbirds in at least three ways: by DCCO presence limiting nest site availability, by DCCOs directly taking over nest sites, or by falling guano and nesting material from DCCO nests leading to the abandonment of nests below. Habitat destruction is another concern reported by biologists (USFWS 2001). The significance of DCCO-related effects on other birds varies with scale. While large-scale impacts on regional or continental bird populations have not been documented (Cuthbert et al. 2002), there is evidence that species such as black-crowned night herons, common terns, and great egrets can be negatively impacted by DCCOs at a site-specific level (Jarvie et al. 1999, Shieldcastle and Martin

1999, USFWS 2001, Weseloh et al. 2002). Biologists from several States and provinces have reported or expressed concern about impacts to other bird species in relation to increased cormorant abundance (Wires et al. 2001, USFWS 2001). Some biologists have also expressed concern about incidental impacts to co-nesting species caused by DCCO control efforts (both lethal and nonlethal). We believe that such impacts are preventable and easily mitigated to a level of insignificance. For example, New York biologists conducting DCCO control work in eastern Lake Ontario have successfully managed to avoid negative impacts to other species such as Caspian terns, herring gulls, and ring-billed gulls (USFWS 2003).

Vegetation and Habitat. Cormorants destroy their nest trees by both chemical and physical means. Cormorant guano, or excrement, is highly acidic and kills ground vegetation and eventually the nest trees. In addition, cormorants damage vegetation by stripping leaves for nesting material and by breaking branches due to the combined weight of the birds and their nests. Vegetation and habitat destruction problems tend to be localized in nature. For example, resource professionals from the Great Lakes region are concerned about loss of plant diversity associated with increasing cormorant numbers at some breeding sites (Weseloh and Ewins 1994, Moore et al. 1995, Lemmon et al. 1994, Bédard et al. 1995, Shieldcastle and Martin 1999).

Aquaculture. Cormorant depredation at commercial aquaculture facilities, particularly those in the southern catfish-producing region, remains economically significant. DCCOs move extensively within the lower Mississippi valley during the winter months (Dolbeer 1990). In the delta region of Mississippi, cormorants have been found to forage relatively close to their night roosting locations with most birds traveling an average distance of less than 20 km from their night roosting locations to their day roosts (King et al. 1995). Cormorants that use day roosts within the catfish-producing regions of the delta typically forage at aquaculture facilities, and USDA researchers have found that as much as 75 percent of the diet of DCCOs in these areas consists of catfish (Glahn et al. 1999). Losses from cormorant predation on fingerling catfish in the delta region of Mississippi have been estimated at approximately 49 million fingerlings each winter, valued at \$5 million. Researchers have estimated the value of catfish at harvest to be about 5 times more than the replacement cost of fingerlings, placing the total value of catfish consumed by DCCOs at approximately \$25 million (Glahn et al. 2000). Total sales of catfish growers in Mississippi amounted to \$261 million in 2001 (USDA-NASS 2002).

Hatcheries. DCCO impacts to hatcheries are related to predation, stress, disease, and financial losses to both hatcheries and recipients of hatchery stock. Hatchery fish may be stressed by the presence of DCCOs, wounds caused by unsuccessful attacks, and noisemakers used to scare away DCCOs. This stress can lead to a decrease in growth factors as feeding intensity decreases. Additionally, disease and parasites can be spread more easily by the presence of fish-eating birds. State and Federal hatchery managers, particularly in the upper midwest (e.g., Wisconsin, Michigan) and the south (e.g., Arizona, Louisiana, Oklahoma, Texas), have reported significant depredation problems at hatcheries (USFWS 2001). Currently, Director's Order No. 27, "Issuance of Permits to Kill Depredating Migratory Birds at Fish Cultural Facilities," dictates that "kill permits [for fish-eating birds] will be issued for use at public facilities only when it has been demonstrated that an emergency or near emergency exists and an [APHIS/WS] official certifies that all other deterrence devices and management practices have failed." The two depredation orders that we are proposing would supersede this Director's Order (for DCCOs only) by giving managers at State, Federal, and Tribal fish hatcheries more authority to control DCCOs to protect fish stock.

Environmental Consequences of Action

We analyzed our action in the FEIS. Our environmental analysis indicates that the action will cause the estimated take of <160,000 DCCOs, which is not predicted to have a significant negative impact on regional or continental DCCO populations; will cause localized disturbances to other birds but these can be minimized by taking preventive measures, leading to the action having beneficial effects overall; will help reduce localized fishery and vegetation impacts; will not adversely affect any Federally listed species; is likely to help reduce localized water quality impacts; will help reduce depredation of aquaculture and hatchery stock; is not likely to significantly benefit recreational fishing economies or commercial fishing; may indirectly reduce property damages; and will have variable effects on existence and aesthetic values, depending on perspective.

References

A complete list of citation references is available upon request from the Division of Migratory Bird Management (see ADDRESSES).

Responses to Significant Comments

During the public comment period on the proposed rule, we received approximately 9,700 emails, letters, and faxes. We provide our responses to significant comments here.

Comment 1: The Service should protect, not kill, DCCOs.

Service Response: In the wildlife management field, the control of birds through the use of humane, but lethal, techniques can be an effective means of alleviating resource damages, preventing further damages, and/or enhancing nonlethal techniques. It would be unrealistic and overly restrictive to limit a resource manager's damage management methods to nonlethal techniques, even if "nonlethal" included nest destruction and/or egg oiling. Lethal control techniques are an important, and in many cases necessary, part of a resource manager's "tool box."

Comment 2: States and other agencies don't have sufficient resources to effectively control DCCOs.

Service Response: Agencies will need to decide whether or not cormorant management is a high enough priority for them to justify committing resources to it. We have tried to keep reporting and evaluation requirements such that they are unlikely to be cost prohibitive. We have also allowed agencies to designate "agents" to act under the orders. Our budget does not currently allow us to provide financial assistance to States and other agencies for cormorant control.

Comment 3: The Service needs to manage DCCOs through a coordinated, regional population objectives approach.

Service Response: The selected action, Alternative D, in no way precludes regional coordination or consideration of population objectives, despite being chiefly a localized damage control approach. We are keeping the option open of taking this approach in the future, given greater biological information and the necessary funding.

Comment 4: The Service needs to reduce overall DCCO populations.

Service Response: At this time, we believe that the evidence better supports Alternative D, a localized damage control strategy rather than Alternative E, a largescale population reduction strategy. While many stakeholders portray cormorant conflicts as being a simple overabundance problem whose solution is population reduction, that is not clearly the case. That is, it is unclear whether fewer cormorants would actually mean fewer problems (since sometimes distribution is as important as number in determining impacts), what the necessary scale of control would be, and whether or not that scale of control is biologically, socially, and economically feasible.

Comment 5: States should be granted full authority to control DCCOs as needed.

Service Response: Under the MBTA, we have the ultimate responsibility for cormorant management. While we can grant States and other agencies increased authority, giving them "full authority" without any limitations and requirements would abdicate our responsibilities.

Comment 6: The final rule should authorize the use of all effective DCCO control methods at aquaculture facilities.

Service Response: The final rule authorizes shooting, which is considered very effective, to be used at aquaculture facilities. There is no evidence of the need for other techniques to be used.

Comment 7: The Service needs to more fully address other causes of fish depletion.

Service Response: We recognize that factors other than DCCOs contribute to resource impacts such as fishery declines. However, an exhaustive and comprehensive analysis of these myriad factors is outside the scope of the

EIS. Our focus is chiefly on addressing conflicts caused by cormorants and then attempting to manage DCCOs, or the resources themselves, to alleviate those conflicts.

Comment 8: There should be a hunting season on DCCOs.

Service Response: While we recognize the validity of hunting as a wildlife management tool, we believe that the risks associated with it outweigh any potential benefits. We are gravely concerned about the negative public perception that would arise from authorizing hunting of a bird with little consumptive (or "table") value. While it is true that this has been done in the past for other species (e.g., crows), public attitudes are different today than they were 30 years ago when those decisions were made. Additionally, a number of hunters commented that they did not support hunting as a means of cormorant control. Therefore, it is our position that hunting is not, on the whole, a suitable technique for reducing cormorant damages.

Comment 9: The Service should add Montana and New Hampshire to the public resource depredation order.

Service Response: We determined that the most crucial States to include in the public resource depredation order were those States with DCCOs from the increasing Interior and Southern populations or States affected by those populations (e.g., those with high numbers of migrating birds). Other States with cormorant conflicts are not precluded from cormorant control but would have to obtain depredation permits.

Comment 10: The Service should remove DCCOs from MBTA protection.

Service Response: In our view, this is not a "reasonable alternative." DCCOs have been protected under the MBTA since 1972. Removing DCCOs from MBTA protection would not only be contrary to the intent and purpose of the original treaty, but would require amending it, a process involving lengthy negotiations and approval of the U.S. Senate and President. Since DCCOs are protected by family (*Phalacrocoracidae*) rather than by species, the end result could be the loss of protection for all North American cormorant species in addition to that of DCCOs. At this time, there is adequate authority for managing cormorant conflicts within the context of their MBTA protection and, thus, we believe the suggestion to remove DCCOs from MBTA protection is not practical, necessary, or in the best interest of the migratory bird resource.

Comment 11: Private landowners should be allowed to control DCCOs on their lands.

Service Response: The take of DCCOs and other migratory birds is regulated by the MBTA and, in most cases, requires a Federal permit. Under the aquaculture depredation order, private commercial aquaculture producers in 13 States are allowed to control DCCOs on their fish farms without a Federal permit. However, all other individuals who experience damages to private resources must contact the appropriate Service Regional Migratory Bird Permit Office for a depredation permit. There is not sufficient justification for authorizing "private landowners" in general to take DCCOs without a Federal permit.

Comment 12: The proposed action will be more effective if agencies coordinate with each other.

Service Response: Yes, this is true. While agencies are not required under the public resource depredation order to coordinate with each other, they are entirely free to do so.

Comment 13: Humaneness and the use of nonlethal methods should be emphasized.

Service Response: Wherever feasible, we have required the use of nonlethal methods before killing is allowed. All authorized control techniques for killing birds outside of the egg are approved by the American Veterinary Medical Association as being humane for the euthanization of birds.

Comment 14: The Service needs to better educate the public about DCCOs.

Service Response: We have prepared fact sheets for public distribution. Information about DCCOs is available at our website http://migratorybirds.fws.gov/issues/cormorant/cormotant.html. Our intention is to distribute fact sheets on the depredation orders in the near future. Beyond DCCOs, we participate in numerous outreach activities around the nation to increase public awareness about the importance of migratory birds and other Federal trust species.

Comment 15: The Service needs to issue permits to allow DCCOs to be shot legally at anytime.

Service Response: The authorization of virtually unregulated shooting of DCCOs would clearly not be a fulfillment of our responsibilities under the MBTA, since it could lead to extermination of the species. We can only allow take under appropriately adopted regulations that are consistent with our obligations and the relevant treaties. The depredation orders issued in this rulemaking only authorize take of DCCOs in certain locations and timeframes, and by certain agencies, to ensure this take is consistent with the purpose for which the depredation order was established.

Comment 16: DCCOs are being scapegoated for fishery declines.

Service Response: The Service recognizes that many factors other than DCCOs can contribute to fishery declines. However, studies have shown that in some cases cormorants are a significant contributing factor to these declines and therefore we believe that DCCO management, where there is evidence of real conflicts, is likely to have beneficial impacts.

Comment 17: The Service is dumping the burden of DCCO control on the States; the Service should take care of the DCCO problem since they created it.

Service Response: The public resource depredation order is not a requirement being forced upon the States (or any other agency). The decision ultimately lies with individual agencies to choose whether or not to use the authority granted to them by the public resource depredation order. As we were considering options for addressing DCCO conflicts more effectively, it became clear that, since many conflicts tend to be localized in nature, a sensible and flexible solution was to allow local agencies more authority in deciding when to control cormorants. The Service did not "create" the cormorant problem. Their population increases are due to many factors, most of which are entirely out of our control.

Comment 18: The Service should provide financial support for DCCO control.

Service Response: We are currently unable to provide funding to other agencies under the public resource depredation order. However, in our Congressional budget request, we have asked for increased financial resources to implement the DCCO selected action. This figure specifically includes money that could be used in cooperative efforts with States and other agencies to conduct cormorant monitoring, research, and management.

Comment 19: California and Wisconsin should be added to the aquaculture depredation order.

Service Response: We do not believe that adding States to the aquaculture depredation order is necessary at this time. Private, commercial, freshwater aquaculture producers can obtain depredation permits to take DCCOs at their fish farms.

Comment 20: The final rule should allow proactive measures to be taken so problems can be dealt with before they become serious.

Service Response: The rule does allow for proactive measures to a certain extent. Both depredation orders allow DCCOs to be taken when "committing or about to commit depredations." The public resource depredation order takes this a step further by allowing for take of DCCOs to prevent depredations on public resources.

Comment 21: Expansion of the aquaculture depredation order to authorize winter roost control should not be

allowed.

Service Response: The USDA report, "A Science-Based Initiative to Manage Double-Crested Cormorant Damage to Southern Aquaculture" notes that "Coordinated and simultaneous harassment of cormorants can disperse them from night roosts and reduce damage at nearby catfish farms" and cites three scientific studies that support this claim. It then concludes that shooting at roosts "might enable farmers to reduce the number of birds on their farms significantly...." Part of the logic behind this is that studies in the Mississippi Delta have shown that, while DCCOs move widely in general, they tend to exhibit high roost fidelity. This implies that shooting birds at roosts (where turnover is lower) is likely to be more effective at alleviating damages than shooting birds just at ponds (where turnover is higher).

Comment 22: Actions in the proposed rule should not be allowed to take place.

Service Response: Clearly, we and our cooperators, APHIS Wildlife Services disagree with this statement. The Record of Decision below explains our rationale.

Comment 23: Hatcheries and fish farms should only be allowed to use nonlethal methods.

Service Response: Shooting is a legitimate and effective technique for scaring away or killing depredating birds that, when done in a controlled manner, has no adverse impact on populations.

Comment 24: Habitat damage caused by DCCOs has not been quantified or confirmed.

Service Response: This statement is incorrect. Vegetation/habitat damage has been both confirmed and quantified. See the FEIS, section 4.2.4, for more details.

Comment 25: APHIS Wildlife Services should be granted full authority to manage migratory birds.

Service Response: Under the MBTA and other laws, the Service has been delegated full responsibility for authorizing the take of and management of migratory bird populations. It would require an act of Congress to grant APHIS this authority. We do not support such action.

Comment 26: The Service should take the lead in DCCO research.

Service Response: The Migratory Bird Management Program monitors over 800 bird species in North America, including cormorants. However, we are not specifically a research agency. Our involvement in research consists mainly of providing financial assistance to researchers. In fewer cases, we are involved in direct research activities (such as color banding work being done in Lake Michigan by the USFWS Green Bay Field Office). We recognize that we have a leadership role to play in encouraging DCCO research.

Comment 27: The proposed rule is not based on "sound science."

Service Response: The Service recognizes the importance of resource management being science-based, and we will always defer to well-designed scientific studies when such information is available. In this case, the Service relied on scientific studies as well as the best available biological knowledge to make its decision. Additionally, social, political, and economic factors contribute to the Service's decisions regarding whether or not to address a problem. Our position is that there is sufficient biological and socioeconomic justification to pursue a solution and sufficient biological information to meet the requirements of the MBTA and to support this rulemaking action.

Comment 28: The Service is caving in to "political pressure" and "special interests."

Service Response: Given the fact that DCCO populations are not at risk in the areas where the depredation orders are authorized, and the Service is granted management flexibility under the MBTA, we believe it is appropriate to

permit control of local DCCO populations. We have considered input from all stakeholders and believe that our decision reflects an appropriate balance of the public interest. Our goal in this and every other issue under our jurisdiction is to make informed, impartial decisions based on scientific and other considerations.

Comment 29: The Service should stay with the No Action alternative.

Service Response: In recent years, it has become clear from public and professional feedback that the status quo is not adequately resolving DCCO conflicts for many stakeholders. Furthermore, our environmental analysis indicated that conflicts were more likely to be resolved under other options than under Alternative A. Comment 30: The proposed rule is a wrongful abdication of the Service's MBTA responsibilities.

Service Response: We disagree. Rather than an abdication of our responsibilities, this rule is an exercise of them. The public resource depredation order by no means puts an end to the Federal role in migratory bird management. The conservation of migratory bird populations is and will remain the Service's responsibility. Second, while the MBTA gives the Federal Government (as opposed to individual States) the chief responsibility for ensuring the conservation of migratory birds, this role does not preclude State involvement in management efforts. Bean (1983) described the Federal/State relationship as such (emphases added):

"It is clear that the Constitution, in its treaty, property, and commerce clauses, contains ample support for the development of a comprehensive body of federal wildlife law and that, to the extent such law conflicts with state law, it takes precedence over the latter. That narrow conclusion, however, does not automatically divest the states of any role in the regulation of wildlife or imply any preference for a particular allocation of responsibilities between the states and the federal government. It does affirm, however, that such an allocation can be designed without serious fear of constitutional hindrance. In designing such a system, for reasons of policy, pragmatism, and political comity, it is clear that the states will continue to play an important role either as a result of federal forbearance or through the creation of opportunities to share in the implementation of federal wildlife programs."

Nowhere in the MBTA is the implementation of migratory bird management activities limited to the Federal Government. In fact, the statute specifically gives the Secretary of Interior the authority to determine when take of migratory birds may be allowed and to adopt regulations for this purpose. Additionally, we've ensured that this rule does not conflict with the Convention for the Protection of Migratory Birds and Game Mammals between the U.S. and Mexico (under which cormorants are protected). Finally, the depredation orders specifically limit the authority of non-Federal entities through the terms and conditions, including suspension and revocation procedures, advance notification requirements, and other restrictions. We would also note that we have the authority to amend this rule in the future if DCCO population status or other conditions demand it.

Comment 31: The Service should more fully consider the economic value of DCCOs and activities associated with them such as birding and photography.

Service Response: Assigning economic value to any wildlife species is difficult, and it is made all the more so when that species (such as the DCCO) is of little direct use to humans. However, this should not be read to imply that we have no regard for the indirect and intangible values of cormorants as a native part of the North American avifauna. As such, we stated clearly in the FEIS (p. 6) that DCCOs "have inherent value regardless of their direct use to humans." A quantitative analysis of the economic benefits associated with DCCO was not possible at this time due to lack of studies in this area. The Service welcomes submission of such studies and will consider them in its analysis of future depredation orders, if applicable.

Comment 32: In addition to the Service, States and APHIS Wildlife Service should have a say in revoking authority under the depredation orders.

Service Response: Since, under the MBTA, the Service is the chief agency responsible for migratory bird management, it is our responsibility to decide when to revoke an agency's or individual's authority under the

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depredation orders. We do, however, give agencies a chance to appeal any revocation decisions.

Comment 33: The public resource depredation order has no sound biological underpinning.

Service Response: We have analyzed the available biological information in the FEIS. We believe our decision is supported by the information available at this time.

Comment 34: Proposed rule contains too much "red tape."

Service Response: We can understand that some people see the rule as having too many mandatory terms and conditions but these are necessary to ensure that the depredation orders are used for their stated purposes and to safeguard cormorant populations and other Federal trust species (e.g., other migratory birds and ESA-protected species). We tried to make the final rule as flexible as we could without compromising these factors.

Comment 35: The public resource depredation order should be expanded to include damages to private property as well.

Service Response: The public resource depredation order does not provide direct relief to private landowners experiencing DCCO conflicts. This is partly because such conflicts have not been well-documented and partly because our practice is not to allow the take of migratory birds, a public resource, to alleviate *minor* damages to private resources (a similar example would be hawks that take privately owned game birds). While the biological and other justification for implementing the aquaculture and public resource depredation orders is strong, this is not necessarily the case for impacts to private resources. In cases of significant economic damage caused by DCCOs, private landowners may request a depredation permit from the appropriate Service Regional Migratory Bird Permit Office.

Comment 36: Requiring monitoring at all control sites is too much of a burden; agencies should be able to use best available information.

Service Response: We understand that strict monitoring requirements (i.e., population surveys) can be cost prohibitive and that, to a certain degree such monitoring is the Service's responsibility. It is important that agencies thoroughly evaluate the impacts of their management actions on DCCOs and, in some cases, on other resources, but we don't want these requirements to be so cost prohibitive that agencies are unable to take any action. Thus, in the final rule, we changed slightly the wording in $\S 21.48(d)(12)$ to account for this.

Comment 37: Monitoring should be required no less than once every 3 years.

Service Response: The Service currently surveys or sponsors surveys of colonial waterbirds every 5-10 years. We believe that such frequency is adequate to ensure the long-term conservation of populations of DCCOs and other migratory birds.

Comment 38: The winter roost control season should be extended to include April.

Service Response: Since numbers of DCCOs at fish farms in the southern United States are known to peak in March and April, and to cause the most damage at that time, we added April to the months in which roost control can occur.

Comment 39: Monitoring requirements under the public resource depredation order are too vague.

Service Response: We may provide future guidelines for monitoring and evaluation for the benefit of other agencies. Until such guidelines are issued, the Service intends to rely on States, Tribes, and APHIS Wildlife Services to develop and implement protocols for evaluation of the effects of control actions.

Comment 40: The proposal is likely to inflame relations between tribal and nontribal interests.

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Service Response: We have not seen sufficient evidence to evaluate whether or not this is indeed likely to occur.

Comment 41: The aquaculture depredation order should be expanded to include all 48 States.

Service Response: At this time, we do not believe the available evidence indicates that expansion beyond 13 States is necessary to further protect commercial aquaculture stock. The issuance of depredation permits for damage at private fish farms is a high priority and, therefore, it is generally a quick process for aquaculture producers to obtain a depredation permit through their Regional Migratory Bird Permit Office.

Comment 42: Under the public resource depredation order, nonlethal techniques (e.g., harassment) should not be prescribed as a mandatory first step at multispecies breeding colonies because of the risk of disturbance.

Service Response: We understand that harassment efforts can have secondary impacts on other colonially nesting birds and that is precisely why we did not require such efforts to be used first but rather stated that they be used "when these are considered effective and practicable by the responsible Agency." We have since changed it to read that agencies "should first utilize nonlethal control methods such as harassment and exclusion devices when these are considered effective and practicable and not harmful to other nesting birds."

Comment 43: The Service should issue guidelines making it clear what constitutes depredation on a public resource.

Service Response: In developing the rule, USFWS wanted to maximize the flexibility of other agencies in determining what constitutes a public resource depredation. We understand that there are concerns about all of the "what ifs" that could conceivably take place in the absence of guidelines. We have made the purpose of the depredation orders clear, and we trust that our agency partners will not abuse their authority. If they do, we have the option to suspend or revoke their authority under the depredation order or to amend this rule.

Comment 44: In the proposed rule, the only advanced requirement for agencies to initiate a control program is to submit a one-time notice to the Service. The rule does not require evaluation of potential impacts before control actions occur.

Service Response: In the final rule, under the public resource depredation order, we have added a clause for advance notification of control actions that would take 10% or more of the birds in a breeding colony. This will allow us to review such actions for compliance with the purpose of the order and for impacts on overall cormorant populations. Inherent in the idea of this public resource depredation order is the Service's trust in the professionalism and conservation expertise of the States, Tribes, and APHIS Wildlife Services. At the same time, we will continue our role of providing oversight to ensure that the cumulative effects of activities under the depredation orders do not threaten the long-term conservation of DCCO populations.

Comment 45: There is no process outlined for disputing control at a particular site. Control activities might come into conflict with ongoing research activities.

Service Response: We do not intend to establish guidelines for dispute resolution or public notice of proposed control efforts. In some cases, NEPA analysis will be necessary and this will open the door for limited public input regarding specific management actions. We cannot guarantee that conflicts won't occur between control and research activities. Researchers will need to coordinate with local resource agencies (as, presumably, they are already doing) on this issue.

Comment 46: The public resource depredation order should have a requirement for agencies to formally assess a control site before control is carried out to determine potential impacts to other species.

Service Response: We do not intend to require formal assessment of control sites before control is conducted. The final rule requires that agencies must provide advance notification for certain actions, including information on the

location and a description of the proposed control activity, specifying what public resources are being impacted, how many birds are likely to be taken and what approximate percentage they are of total DCCOs present, and which species of other birds are present. Additionally, in their annual reports, agencies must provide us with detailed information on why they're conducting control actions, including what they're doing to minimize effects on other species. Agencies don't have to report this information until after control actions have occurred, but we believe this process is sufficient.

Comment 47: The proposed rule seems to violate the Service's mission to "conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

Service Response: We do not in any way believe that the rule interferes with our conservation mission. Our responsibility is to ensure the long-term conservation of DCCO populations, and we will do so. A mission is a general statement of an agency's vision that, by its very nature, cannot encompass every potential management responsibility. We believe that managing certain species to address economic or social concerns, while ensuring the long-term conservation of such species is consistent with our mission.

Comment 48: The Service has not established a process by which other agencies could set population goals.

Service Response: At some point in the future, we may initiate a process for setting population goals. States and other agencies are fully capable of doing this on their own in local situations (DCCO management efforts on Little Galloo Island in New York are a good example). The public resource depredation order does not authorize regional population management, and, therefore, regional goals are not yet necessary.

Comment 49: The return of an extirpated species to its former breeding range is a positive ecological event.

Service Response: Weseloh et al. (1995, p48) wrote that DCCO population increases in North America "have involved more than just a re-occupation of areas which experienced severe population declines or extirpations...previously unoccupied breeding and wintering areas have now been colonized" and gave three citations supporting this hypothesis. Regardless of whether or not DCCOs had previously occurred in some parts of their range, we have to manage and conserve them by today's standards, not those of a hundred (or more) years ago. Our intent under the final rule is not to eliminate cormorants on a regional or national level but to manage them, even to the point of reducing local populations, so that there are fewer impacts to natural and human resources. We fully understand that fish-eating birds are a natural part of the ecosystem and that, within limits prescribed by the need to consider the bigger picture than "ecological" factors alone, population recovery is a positive event.

Comment 50: Only State wildlife agencies should be allowed to take or permit the take of DCCOs at nesting colonies in their State.

Service Response: Under the public resource depredation order, any agency that takes DCCOs must have landowner permission and, if required, a State permit to take DCCOs. We believe that these clauses are sufficient to avoid compromising State oversight.

Comment 51: Issuing a resource depredation order for DCCOs under the proposed rule would set a dangerous precedent for fish-eating birds in the United States and in other nations to our south.

Service Response: We do not agree with the statement that the depredation orders are a "dangerous" precedent. Each conflict must be evaluated on its own merits. If problems with other fish-eating birds arise in the future, we will give full and fair consideration to these issues.

Comment 52: The Service should require safe management practices when DCCO control is conducted to protect birders.

Service Response: Conducting DCCO control in a manner that does not threaten human health or safety is the

responsibility of the agencies and individuals carrying out the actions.

Comment 53: The scientific and public outcry against the Service's proposed rule should be convincing. Sound science is being supplanted by perceptions fueling political cries for substantial lethal population controls.

Service Response: We would note that there is also public outcry against the status quo and in support of the final rule. We believe that our decision is supported by the available data. Furthermore, the rule requires that agencies who act under the public resource depredation order have sound reasoning for doing so.

Comment 54: The Service must publish a Final EIS, Record of Decision, and appropriate Section 7 consultation documents prior to engaging in the rulemaking process.

Service Response: This is not a correct statement of the requirements of either the National Environmental Policy Act or the Endangered Species Act. Issuance of these regulations is in compliance with both of these laws.

Comment 55: The Service cannot establish depredation orders for DCCOs because they are not a "migratory game bird" pursuant to 50 CFR 21.42.

Service Response: This is incorrect because our authority for issuing a depredation order comes from the MBTA, not 50 CFR 21.42. Section 21.42 is a regulation adopted by the Service that allows the Director to issue depredation orders under certain circumstances. This new regulation is in addition to 21.42. Comment 56: The Service needs to specify how the depredation orders will be enforced.

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Service Response: We have law enforcement agents in every State who investigate violations of Federal wildlife laws. Providing the details of how they work is neither necessary nor sensible since such details could prevent the prosecution of those who violate the terms and conditions of the orders.

Comment 57: The requirement to report unauthorized take of migratory birds or threatened and endangered species requires individuals to incriminate themselves and thus violates the Fifth Amendment to the Constitution.

Service Response: While any take, unless permitted, is prohibited by statute, the Service directs its enforcement efforts on those individuals or companies that take migratory bird species outside the scope of the depredation orders. It is incumbent on those who will be working under the orders to have a working knowledge of what is authorized and to properly act under its terms and conditions. Failure to report would be grounds to revoke authorization. The Service sees the reporting requirements not as an attempt to identify the unlawful take of migratory birds but as a management tool to reduce unauthorized take.

Cormorant Regulations Under the Rule

This final rule implements the FEIS selected action in the following ways: (1) it revises the 1998 aquaculture depredation order that allows APHIS/WS to protect public and private aquacultural stock in the 13 States listed in 50 CFR 21.47 by also allowing the take of DCCOs at winter roost sites and at State and Federal fish hatcheries; and (2) it establishes a new depredation order authorizing State fish and wildlife agencies, Federally recognized Tribes, and APHIS/WS to take DCCOs without a Federal permit to protect public resources on public and private lands and freshwaters in 24 States (the 13 States listed in 50 CFR 21.47 and 11 additional States). Both of the actions revise subpart D of 50 CFR 21.

NEPA Considerations

In compliance with the requirements of section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(C)), and the Council on Environmental Quality's regulation for implementing NEPA (40 CFR 1500-1508), we published a DEIS in December 2001, followed by a 100-day public comment period. In August 2003, both the Service and the Environmental Protection Agency published notices of availability for the FEIS in the Federal Register. This FEIS is available to the public (see ADDRESSES).

Endangered Species Act Considerations

Section 7(a)(2) of the Endangered Species Act, as amended (16 U.S.C. 1531-1543; 87 Stat. 884) provides that "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat...." We completed a biological evaluation and informal consultation (both available upon request; see ADDRESSES) under Section 7 of the ESA for the action described in this final rule. In the letter of concurrence between the Division of Migratory Bird Management and the Division of Endangered Species, we concluded that the inclusion of specific conservation measures in the final rule satisfies concerns about the four species (piping plover, interior least tern, bald eagle, and wood stork) and therefore the proposed action is not likely to adversely affect any threatened, endangered, or candidate species.

Executive Order 12866

In accordance with the criteria in Executive Order 12866, this action is a significant regulatory action subject to Office of Management and Budget review. OMB has made this determination of significance under the Executive Order. OMB has determined that this action raises novel legal or policy issues. This rule will not have an annual economic effect of \$100 million or more or adversely affect any economic sector, productivity, competition, jobs, the environment, or other units of government. The purpose of this rule is to help reduce adverse effects caused by cormorants, thereby providing economic relief. The total estimated economic impact of DCCOs is less than \$50 million per year. Assuming that landowners (e.g., aquaculture producers) and other stakeholders utilize, informally or formally, some degree of cost-benefit analysis, the financial expenses to control cormorant problems should not exceed the damages incurred. Thus we can assume that the total annual economic effect of this rule will be less than \$50 million.

This rulemaking action will not create inconsistencies with other agencies' actions or otherwise interfere with an action taken or planned by another agency. The selected action is consistent with the policies and guidelines of other Department of the Interior bureaus. This action will not materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 et seq.) requires the preparation of flexibility analyses for actions that will have a significant economic effect on a substantial number of small entities, which includes small businesses, organizations, or governmental jurisdictions. Because of the structure of wildlife damage management, the economic impacts of our action will fall primarily on State governments and APHIS/WS. These do not qualify as "small governmental jurisdictions" under the Act's definition. Effects on other small entities, such as aquacultural producers, will be positive but are not predicted to be significant. Thus, we have determined that a Regulatory Flexibility Act analysis is not required.

Small Business Regulatory Enforcement Fairness Act

This rule is not a major rule under 5 U.S.C. 804(2), the Small Business Regulatory Enforcement Fairness Act. It will not have an annual effect on the economy of \$100 million or more, nor will it cause a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions. It will not have significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises.

Paperwork Reduction Act and Information Collection

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the Office of Management and Budget (OMB) has approved the information collection requirements included in this final rule under OMB control number 1018-0121, which expires on May 31, 2006. Agencies may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

We will collect information from State, Tribal, and Federal agencies and private aquaculture producers who conduct DCCO management under the authority of the depredation orders. The specific monitoring and reporting

requirements associated with this rule are listed below. The information collected will help us to determine how many DCCOs are being taken and for what purposes.

In response to public comments on the proposed rule (68 FR 12653, March 17, 2003), we added one new information collection requirement in this final rule that was not included in the proposed rule. That new requirement is advance notification to the Service of any control actions that would take more than 10 percent of a breeding DCCO population. This new requirement is located in § 21.48 (d)(9) and adds 165 hours to the total annual hour burden of these information collection requirements.

The information collections associated with this final rule are in §§ 21.47(d)(7), (d)(8), and (d)(9) and 21.48(d)(7), (d)(8), (d)(9), (d)(10) and (d)(12) and are listed below in the amendments to 50 CFR part 21. The breakdown of the information collection burden is as follows: We estimate that §§ 21.47(d)(7) and (d)(8) will have 50 annual responses at an estimated .5 burden hours per response; we estimate that § 21.47(d)(9) will have 900 annual responses at an estimated 2 burden hours per response; we estimate that § 21.48(d)(7) and (d)(8) will have 10 annual responses at an estimated average of 3 burden hours per response; we estimate that § 21.48(d)(9) will have 75 annual responses at an estimated 20 burden hours per response; and we estimate that § 21.48(d)(12) will have 60 annual responses at an estimated 80 burden hours per response. Overall, we estimate that a total of 960 respondents will annually submit a total of 1,105 responses to the recordkeeping and reporting requirements associated with these depredation orders. Each response will require an average of 3.67 hours to complete, for a total of 4,055 hours per year for all of the information collection and recordkeeping requirements in this final rule.

OMB regulations at 5 CFR part 1320 require that interested members of the public and affected agencies have an opportunity to comment on information collection and record keeping activities. If you have any comments on this information collection at any time, please contact the Service Information Collection Officer, 4401 N. Fairfax Drive, Suite 222, Arlington, VA 22203.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 requires agencies to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. We have determined, in compliance with the requirements of the Unfunded Mandates Reform Act, 2 U.S.C. 1502 et seq., that the selected action would not "significantly or uniquely" affect small governments, and will not produce a Federal mandate of \$100 million or more in any given year on local or State government or private entities. Therefore, this action is not a "significant regulatory action" under the Unfunded Mandates Reform Act.

Takings Implication Assessment

In accordance with Executive Order 12630, this action does not have significant takings implications and does not affect any constitutionally protected property rights. This action will not result in the physical occupancy of property, the physical invasion of property, or the regulatory taking of any property. In fact, this action will help alleviate private and public property damage and allow the exercise of otherwise unavailable privileges.

Federalism Effects

Due to the migratory nature of certain species of birds, the Federal Government has been given statutory responsibility over these species by the MBTA. While legally this responsibility rests solely with the Federal Government, in the best interest of the migratory bird resource we work cooperatively with States and other relevant agencies to develop and implement the various migratory bird management plans and strategies. This action does not have a substantial direct effect on fiscal capacity, change the roles or responsibilities of Federal or State governments, or intrude on State policy or administration. It will allow, but will not require, States to develop and implement their own DCCO management programs. Therefore, in accordance with Executive Order 13132, this action does not have significant federalism effects and does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Civil Justice Reform

Under Executive Order 12988, the Office of the Solicitor has determined that this policy does not unduly burden the judicial system and meets the requirements of Sections 3(a) and 3(b)(2) of the Order.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments" (59 FR 22951) and Executive Order 13175, we have determined that this action has no significant effects on Federally recognized Indian Tribes. In order to promote consultation with Tribes, a copy of the DEIS was mailed to all Federally recognized Tribes in the continental United States.

Energy Effects-Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As the selected action is not expected to significantly affect energy supplies, distribution, or use, this action is not a significant energy action and no Statement of Energy Effects is required.

RECORD OF DECISION

The Record of Decision for management of double-crested cormorants in the United States, prepared pursuant to National Environmental Policy Act (NEPA) regulations at 40 CFR 1505.2, is herein published in its entirety.

This Record of Decision (ROD) has been developed by the U.S. Fish and Wildlife Service (Service) in compliance with the agency decision-making requirements of NEPA. The purpose of this ROD is to document the Service's decision for the selection of an alternative for managing resource damages associated with the double-crested cormorant (DCCO). Alternatives have been fully described and evaluated in the August 2003 Final Environmental Impact Statement (FEIS) on DCCO management in the United States.

This ROD is intended to: (a) state the Service's decision, present the rationale for its selection, and describe its implementation; (b) identify the alternatives considered in reaching the decision; and (c) state whether all means to avoid or minimize environmental harm from implementation of the selected alternative have been adopted (40 CFR 1505.2).

PROJECT DESCRIPTION

Increases in DCCO populations over the past 25 years, combined with other environmental and social factors, have led to greater occurrences of both real and perceived conflicts with human and natural resources. In 1999, in response to urgings from the public and from State and Federal wildlife agencies, the Service decided to prepare a programmatic EIS, in cooperation with the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS/WS), to evaluate the significance of, and consider alternatives to address, conflicts associated with DCCOs.

KEY ISSUES

Public involvement occurred throughout the EIS and rulemaking process. From 1999 to 2003, we held 22 public meetings over the course of more than 10 months of total public comment. Through public scoping (the first stage of public comment) and agency discussions, key issues were identified. Key issues can be placed into two general categories: (1) impacts caused by DCCOs (including impacts to other birds, fish, vegetation, aquaculture, Federally listed species, water quality, hatcheries, recreational fishing economies, and commercial fishing); and (2) impacts caused by control actions (including impacts to DCCO populations, other birds, Federally listed species, and existence and aesthetic values). In the EIS environmental analysis, these issues made up the environmental categories for which effects of the different alternatives were considered.

The alternatives were also considered in terms of their ability to fulfill the purpose of the proposed action: to reduce resource conflicts associated with DCCOs in the contiguous United States, to enhance the flexibility of natural

resource agencies in dealing with DCCO-related resource conflicts, and to ensure the long-term conservation of DCCO populations.

ALTERNATIVES

Since the FEIS is a programmatic document, the alternatives reflect general management approaches to the alleviation of DCCO resource damages. Six alternatives were examined in the EIS: (A) No Action, (B) Nonlethal, (C) Increased Local Damage Control, (D) Public Resource Depredation Order, (E) Regional Population Reduction, and (F) Regulated Hunting.

Alternative A

Alternative A is essentially the no change, or status quo, alternative. The main features of this alternative are the issuance of a small number of depredation permits to address DCCO conflicts; an aquaculture depredation order that allows commercial, freshwater aquaculture producers in 13 States to shoot DCCOs without a permit; unregulated nonlethal harassment of DCCOs; and Director's Order No. 27, which prevents most public fish hatcheries from conducting lethal take of DCCOs.

Alternative B

Alternative B would not allow the take of DCCOs or their eggs. Only harassment methods and physical exclusion devices would be used to prevent or control DCCO damages.

Alternative C

Alternative C would allow for increased take of DCCOs, through a revision of our cormorant damage management practices, but agencies and individuals would still have to obtain a depredation permit. It would also revise the aquaculture depredation order to allow winter roost control.

Alternative D

Alternative D, the selected action, creates a public resource depredation order to authorize State fish and wildlife agencies, Federally recognized Tribes, and APHIS/WS to take DCCOs found committing or about to commit, and to prevent, depredations on the public resources of fish (including hatchery stock at Federal, State, and Tribal facilities), wildlife, plants, and their habitats. This authority applies to all lands and freshwaters (with appropriate landowner permission) in 24 States (Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Vermont, West Virginia, and Wisconsin). This alternative also revises the aquaculture depredation order by specifying that it is applicable to commercial freshwater facilities and State and Federal fish hatcheries, and by authorizing APHIS/WS employees to take DCCOs at roost sites in the vicinity of aquaculture facilities during the months of October, November, December, January, February, March, and April. Depredation permits would continue to be used to address conflicts outside the authority of the depredation orders.

Alternative E

Alternative E would reduce regional DCCO populations to pre-determined levels. Population objectives would be developed on an interdisciplinary, interagency basis and would be based on the best available data, while giving consideration to other values. Control would be carried out at nesting, roosting, wintering, and all other sites in order to achieve those objectives as rapidly as possible without adversely affecting other protected migratory birds or threatened and endangered species.

Alternative F

Under Alternative F, frameworks to develop seasons and bag limits for hunting DCCOs would be established jointly by Federal and State wildlife agencies. These seasons would coincide with those for waterfowl hunting.

DECISION

The Service's decision is to implement the preferred alternative, Alternative D, as it is presented in the final rule. This decision is based on a thorough review of the alternatives and their environmental consequences.

Other Agency Decisions

A Record of Decision will be produced by APHIS/WS. The responsible officials at APHIS/WS will adopt the FEIS.

RATIONALE FOR DECISION

As stated in the CEQ regulations, "the agency's preferred alternative is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors." The preferred alternative has been selected for implementation based on consideration of a number of environmental, regulatory, and social factors. Based on our analysis, the preferred alternative would be more effective than the current program; is environmentally sound, cost effective, and flexible enough to meet different management needs around the country; and does not threaten the long-term sustainability of DCCO populations or populations of any other natural resource.

Alternative D was selected because it allows greater responsiveness in addressing localized resource damages (and will therefore be more effective at reducing or preventing them) than the No Action Alternative. It will provide a net benefit to fish, wildlife, and plants by allowing agencies to control DCCOs to protect these resources from damages. It will also alleviate economic damages to aquaculture. Through successful implementation of mitigation measures, it will not result in negative impacts to DCCO populations, other migratory birds, or Federally listed species. As such, this alternative represents the environmentally preferable alternative.

The No Action Alternative (A) was not selected for implementation because by itself it would not adequately address resource damages caused by DCCOs. The Nonlethal Management Alternative (B) was not selected because it severely limits the scope of allowable control techniques and would not adequately address resource damages caused by DCCOs. The Increased Local Damage Control Alternative (C) was not selected because it does not provide other agencies with the flexibility needed to adequately address resource damages caused by DCCOs. The Regional Population Reduction Alternative (E) was not selected because of uncertainty about the actual relationship between cormorant numbers and distribution and subsequent damages. The Regulated Hunting Alternative (F) was not selected because hunting is not a biologically or socially acceptable means of reducing DCCO damages.

List of Subjects in 50 CFR Part 21

Exports, Hunting, Imports, Reporting and recordkeeping requirements, Transportation, Wildlife.

For the reasons stated in the preamble, we hereby propose to amend part 21, of subchapter B, chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 21-[AMENDED]

- 1. The authority citation for part 21 is revised to read as follows: Authority: Pub. L. 95-616; 92 Stat. 3112 (16 U.S.C. 712(2)); Pub. L. 106-108; Section 3 of the Migratory Bird Treaty Act (16 U.S.C. 704), 40 Stat. 755.
- 2. In Subpart D, revise § 21.47 to read as follows:

§ 21.47 Depredation order for double-crested cormorants at aquaculture facilities.

(a) What is the purpose of this depredation order?

The purpose of this depredation order is to help reduce depredation of aquacultural stock by double-crested cormorants at private fish farms and State and Federal fish hatcheries.

(b) In what areas can this depredation order be implemented?

This depredation order applies to commercial freshwater aquaculture facilities and to State and Federal fish hatcheries in the States of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Minnesota, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

(c) What does this depredation order allow and who can participate?

- (1) This depredation order authorizes landowners, operators, and tenants (or their employees or agents) actually engaged in the commercial, Federal, or State production of freshwater aquaculture stocks to take, without a Federal permit, double-crested cormorants when they are found committing or about to commit depredations to aquaculture stocks. This authority is applicable only during daylight hours and only within the boundaries of freshwater commercial aquaculture facilities or State and Federal hatcheries.
- (2) This depredation order authorizes employees of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service to take double-crested cormorants, with appropriate landowner permission, at roost sites in the vicinity of aquaculture facilities, at any time, day or night, during the months of October, November, December, January, February, March, and April.
- (3) Authorized employees of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service may designate agents to carry out control, provided these individuals act under the conditions of the order.

(d) What are the terms and conditions of this order?

- (1) Persons operating under paragraph (c)(1) of this section may only do so in conjunction with an established nonlethal harassment program as certified by officials of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service. Wildlife Services directive 2.330 outlines this certification process.
- (2) Double-crested cormorants may be taken only by shooting with firearms, including rifles. Persons using shotguns are required to use nontoxic shot as listed in 50 CFR 20.21(j).
- (3) Persons operating under this depredation order may use decoys, taped calls, or other devices to lure within gun range birds committing or about to commit depredations.
- (4) Persons operating under this depredation order must obtain appropriate landowner permission before implementing activities authorized by the order.
- (5) Double-crested cormorants may not be killed contrary to the laws or regulations of any State, and none of the privileges of this section may be exercised unless the person possesses the appropriate State or other permits, if required.
- (6) Persons operating under this depredation order must properly dispose of double-crested cormorants killed in control efforts:
- (i) Individuals may donate birds killed under authority of this order to museums or other such scientific and educational institutions for the purposes of scientific or educational exhibition;
- (ii) Individuals may also bury or incinerate birds taken; and
- (iii) Individuals may not allow birds taken under this order, or their plumage, to be sold, offered for sale, bartered, or shipped for purpose of sale or barter.

- (7) Nothing in this depredation order authorizes the take of any migratory bird species other than double-crested cormorants. Two look-alike species co-occur with double-crested cormorants in the southeastern States: the anhinga, which occurs across the southeastern United States, and the neotropic cormorant, which is found in varying numbers in Texas, Louisiana, and Oklahoma. Both species can be mistaken for double-crested cormorants, but take of these two species is not authorized under this depredation order. Persons operating under this order must immediately report the take of a migratory bird species other than double-crested cormorants to the appropriate Service Regional Migratory Bird Permit Office.
- (8) Nothing in this depredation order authorizes the take of any species protected by the Endangered Species Act. Persons operating under this order must immediately report the take of species protected under the Endangered Species Act to the Service.
- (i) To protect wood storks and bald eagles, the following conservation measures must be observed within any geographic area where Endangered Species Act protection applies to these species: All control activities are allowed if the activities occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks, and if they occur more than 750 feet from active bald eagle nests.
- (ii) At their discretion, landowners, operators, and tenants may contact the Regional Migratory Bird Permit Office to request modification of the measures listed above in paragraph (d)(8)(i) of this section. Such modification can occur only if the Regional Director determines, on the basis of coordination between the Regional Migratory Bird Permit Office and the Endangered Species Field Office, that wood storks and bald eagles will not be adversely affected.
- (iii) If adverse effects are anticipated from the control activities in a geographical area where Endangered Species Act protection applies to wood storks or bald eagles, either during the intra-Service coordination discussions described above or at any other time, the Regional Migratory Bird Permit Office will initiate consultation with the Endangered Species Field Offices.
- (9) Persons operating under this depredation order must:
- (i) Keep a log recording the date, number, and location of all birds killed each year under this authorization;
- (ii) Maintain this log for a period of 3 years (and maintain records for 3 previous years of takings at all times thereafter); and
- (iii) Each year, provide the previous year's log to the appropriate Service Regional Migratory Bird Permit Office. Regional Office addresses are found in § 2.2 of subchapter A of this chapter.
- (10) We reserve the right to suspend or revoke the authority of any Agency or individual granted by this order if we find that the specified purpose, terms, and conditions have not been adhered to by that Agency or individual or if the long-term sustainability of double-crested cormorant populations is threatened by that Agency's or individual's action(s),. The criteria and procedures for suspension, revocation, reconsideration, and appeal are outlined in §§13.27 through 13.29 of this subchapter. For the purposes of this rule, "issuing officer" means the Regional Director and "permit" means the authority to act under this depredation order. For purposes of §13.29(e), appeals shall be made to the Director.
- (e) <u>Does this rule contain information collection requirements?</u>
 Yes. The information collection requirements in this section are approved by the Office of Management and Budget (OMB) under OMB control number 1018-0121. Federal agencies may not conduct or sponsor, and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.
- (f) When does this depredation order expire?
 This depredation order will automatically expire on April 30, 2009, unless revoked or extended prior to that date.
- 3. In Subpart D, add § 21.48 to read as follows:
- § 21.48 Depredation order for double-crested cormorants to protect public resources.

(a) What is the purpose of this depredation order?

The purpose of this depredation order is to reduce the occurrence and/or minimize the risk of adverse impacts to public resources (fish, wildlife, plants, and their habitats) caused by double-crested cormorants.

(b) In what areas can this depredation order be implemented?

This depredation order applies to all lands and freshwaters in the States of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Vermont, West Virginia, and Wisconsin.

(c) What does this depredation order allow and who can participate?

- (1) This depredation order authorizes State fish and wildlife agencies, Federally recognized Tribes, and State Directors of the Wildlife Services program of the U.S. Department of Agriculture Animal and Plant Health Inspection Service (collectively termed "Agencies") to prevent depredations on the public resources of fish (including hatchery stock at Federal, State, and Tribal facilities), wildlife, plants, and their habitats by taking without a permit double-crested cormorants found committing or about to commit, such depredations.
- (2) Agencies may designate agents to carry out control, provided those individuals act under the conditions of the order.
- (3) Federally recognized Tribes and their agents may carry out control only on reservation lands or ceded lands within their jurisdiction.

(d) What are the terms and conditions of this order?

- (1) Persons operating under this order should first utilize nonlethal control methods such as harassment and exclusion devices when these are considered effective and practicable and not harmful to other nesting birds by the responsible Agency.
- (2) Double-crested cormorants may be taken only by means of egg oiling, egg and nest destruction, cervical dislocation, firearms, and CO₂ asphyxiation. Persons using shotguns must use nontoxic shot, as listed in 50 CFR 20.21(j). Persons using egg oiling must use 100 percent corn oil, a substance exempted from regulation by the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide, and Rodenticide Act.
- (3) Persons operating under this depredation order may use decoys, taped calls, or other devices to lure within gun range birds committing or about to commit depredation of public resources.
- (4) Persons operating under this depredation order must obtain appropriate landowner permission before implementing activities authorized by the order.
- (5) Persons operating under this depredation order may not take double-crested cormorants contrary to the laws or regulations of any State, and none of the privileges of this section may be exercised unless the person possesses the appropriate State or other permits, if required.
- (6) Persons operating under this depredation order must properly dispose of double-crested cormorants killed in control efforts:
- (i) Individuals may donate birds killed under authority of this order to museums or other such scientific and educational institutions for the purposes of scientific or educational exhibition;
- (ii) Individuals may also bury or incinerate birds taken; and
- (iii) Individuals may not allow birds taken under this order, or their plumage, to be sold, offered for sale, bartered, or shipped for purpose of sale or barter.
- (7) Nothing in this depredation order authorizes the take of any migratory bird species other than double-crested cormorants. Two look-alike species co-occur with double-crested cormorants in the southeastern States: the anhinga, which occurs across the southeastern United States, and the neotropic cormorant, which is found in varying

numbers in Texas, Louisiana, Kansas, and Oklahoma. Both species can be mistaken for double-crested cormorants, but take of these two species is not authorized under this depredation order. Persons operating under this order must immediately report the take of a migratory bird species other than double-crested cormorants to the appropriate Service Regional Migratory Bird Permit Office.

- (8) Nothing in this depredation order authorizes the take of any species protected by the Endangered Species Act. Persons operating under this order must immediately report the take of species protected under the Endangered Species Act to the Service.
- (i) To protect piping plovers, interior least terns, wood storks, and bald eagles, the following conservation measures must be observed within any geographic area where Endangered Species Act protection applies to these species:
- (A) The discharge/use of firearms to kill or harass double-crested cormorants or use of other harassment methods are allowed if the control activities occur more than 1,000 feet from active piping plover or interior least tern nests or colonies; occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;
- (B) Other control activities such as egg oiling, cervical dislocation, CO₂ asphyxiation, egg destruction, or nest destruction are allowed if these activities occur more than 500 feet from active piping plover or interior least tern nests or colonies; occur more than 1,500 feet from active wood stork nesting colonies, more than 1,000 feet from active wood stork roost sites, and more than 750 feet from feeding wood storks; or occur more than 750 feet from active bald eagle nests;
- (C) To ensure adequate protection of piping plovers, any Agency or its agents who plan to implement control activities that may affect areas designated as piping plover critical habitat in the Great Lakes Region are to obtain prior approval from the appropriate Regional Director. Requests for approval of activities in these areas must be submitted to the Regional Migratory Bird Permit Office. The Regional Migratory Bird Permit Office will then coordinate with the Endangered Species Field Office staff to assess whether the measures in paragraph (B) are adequate.
- (ii) At their discretion, Agencies or their agents may contact the Regional Migratory Bird Permit Office to request modification of the above measures. Such modification can occur only if the Regional Director determines, on the basis of coordination between the Regional Migratory Bird Permit Office and the Endangered Species Field Office, that the species listed in (8)(i) will not be adversely affected.
- (iii) If adverse effects are anticipated from the control activities in a geographical area where Endangered Species Act protection applies to any of the four species listed in (8)(i), either during the intra-Service coordination discussions described above or at any other time, the Regional Migratory Bird Permit Office will initiate consultation with the Endangered Species Field Offices.
- (9) Responsible Agencies must, before they initiate any control activities in a given year, provide a one-time written notice to the appropriate Service Regional Migratory Bird Permit Office indicating that they intend to act under this order.
- (i) Additionally, if any Agency plans a single control action that would individually, or a succession of such actions that would cumulatively, kill more than 10 percent of the double-crested cormorants in a breeding colony, it must first provide written notification to the appropriate Service Regional Migratory Bird Permit Office. This letter must be received no later than 30 days in advance of the activity and must provide:
- (A) the location (indicating specific colonies, if applicable) of the proposed control activity;
- (B) a description of the proposed control activity, specifying what public resources are being impacted, how many birds are likely to be taken and what approximate percentage they are of total DCCOs present, and which species of other birds are present; and
- (C) contact information for the person in charge of the control action.
- (ii) The Regional Director may prevent any such activity by notifying the agency in writing if the Regional Director deems the activity a threat to the long-term sustainability of double-crested cormorants or any other migratory bird

species.

- (10) Persons operating under this order must keep records of all activities, including those of designated agents, carried out under this order. On an annual basis, Agencies must provide the Service Regional Migratory Bird Permit Office with a report detailing activities conducted under the authority of this order, including:
- (i) By date and location, a summary of the number of double-crested cormorants killed and/or number of nests in which eggs were oiled;
- (ii) A statement of efforts being made to minimize incidental take of nontarget species and a report of the number and species of migratory birds involved in such take, if any;
- (iii) A description of the impacts or anticipated impacts to public resources by double-crested cormorants and a statement of the management objectives for the area in question;
- (iv) A description of the evidence supporting the conclusion that double-crested cormorants are causing or will cause these impacts;
- (v) A discussion of other limiting factors affecting the resource (e.g., biological, environmental, and socioeconomic); and
- (vi) A discussion of how control efforts are expected to, or actually did, alleviate resource impacts.
- (11) Agencies must provide annual reports to the appropriate Service Regional Migratory Bird Permit Office, as described above, by December 31 for the reporting period October 1 of the previous year to September 30 of the same year. For example, reports for the period October 1, 2003, to September 30, 2004, would be due on or before December 31, 2004. The Service will regularly review Agency reports and will periodically assess the overall impact of this program to ensure compatibility with the long-term conservation of double-crested cormorants and other resources.
- (12) In some situations, Agencies may deem it necessary to reduce or eliminate local breeding populations of double-crested cormorants to reduce the occurrence of resource impacts.
- (i) For such actions, Agencies must:
- (A) Comply with paragraph 9 of this subsection;
- (B) Carefully plan activities to avoid disturbance of nontarget species;
- (C) Evaluate effects of management activities on cormorants at the control site;
- (D) Evaluate, by means of collecting data or using best available information, effects of management activities on the public resources being protected and on nontarget species; and
- (E) Include this information in the report described above in paragraph (d)(10) of this subsection.
- (ii) Agencies may coordinate with the appropriate Service Regional Migratory Bird Permit Office in the preparation of this information to attain technical or other assistance.
- (13) We reserve the right to suspend or revoke the authority of any Agency, Tribe, or State Director granted by this order if we find that the specified purpose, terms, and conditions have not been adhered to or if the long-term sustainability of double-crested cormorant populations is threatened by the action(s) of that Agency, Tribe, or State Director. The criteria and procedures for suspension, revocation, reconsideration, and appeal are outlined in §§13.27 through 13.29 of this subchapter. For the purposes of this rule, "issuing officer" means the Regional Director and "permit" means the authority to act under this depredation order. For purposes of §13.29(e), appeals shall be made to the Director.
- (e) Does this rule contain information collection requirements?

Yes. The information collection requirements in this section are approved by the Office of Management and Budget (OMB) under OMB control number 1018-0121. Federal agencies may not conduct or sponsor, and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.

(f) When does this depredation order expire?

This depredation order will automatically expire on April 30, 2009, unless revoked or extended prior to that date.

Date: September 25, 2003

Paul Hoffman

Acting Assistant Secretary – Fish, Wildlife, and Parks BILLING CODE: 4310-55-P